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February 8, 1934

ANNUAL REVIEW OF ENGINEERING PROGRESS

The events of very few years in the history of civil engineering have left such an imprint as did those of 1933. Unprecedented unemployment was followed by substantial improvement. The nation accepted a public works program and Congress appropriated large sums therefor. Codes and the NRA, contracts and the PWA, politics and the CWA, changed the familiar pattern of construction. Progress toward consolidation of the diverse elements of construction into an integrated industry was made. And interwoven with these economic developments was technical advance of a high order. This issue reviews the happenings of this eventful year and brings authoritative evaluation to bear upon them. An understanding of the facts and figures that it marshalls should aid in charting future progress.

Business and Finance
Bernhard Ostrolenk

Public Works and the PWA
David Cushman Coyle

Codifying Industry
Wallace Thompson

Drafting Codes for Construction
James W. Follin

Expansion and National Planning
Charles W. Eliot II

Trends in Municipal Finance
Frederick L. Bird

The Nation's Employment Picture
Isador Lubin

Labor Policies and Plans
William Green

Appraisals of Special Fields
. . . . CONTRACTING, N. F. Helmers
. . . . RESEARCH, F. E. Richart
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An Editorial Review of Events

Facts and Figures of Construction

Review of Major Engineering Projects

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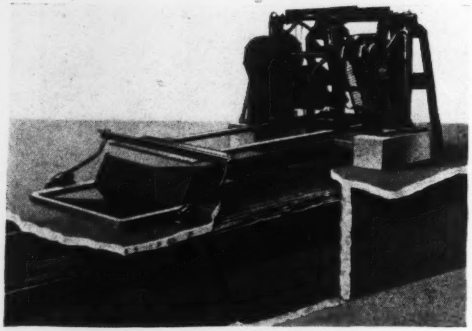
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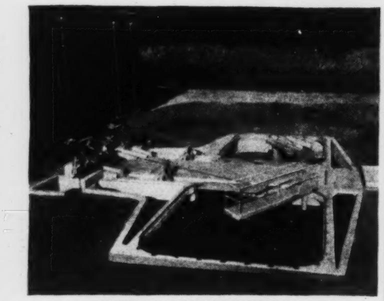
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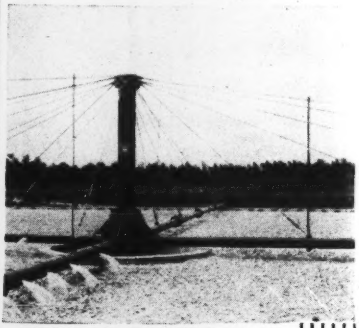
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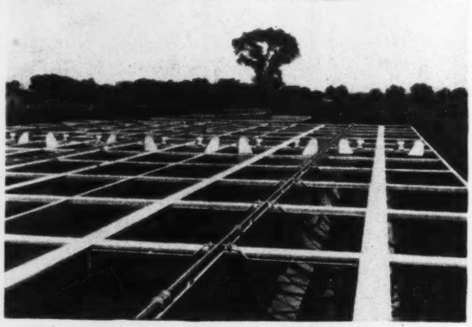
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In This Issue:

THE DESIRABILITY of an annual issue, in which the events and achievements of the preceding year are passed in review, and to some extent evaluated, has always seemed to us to be unquestioned. In respect to 1933, there is a real need for bringing its happenings into one composite picture. No year has been more eventful. And the events of no year in recent memory have been so full of connotations for the future.

This issue, then, is the annual review issue for 1933. It is built around the two or three most significant developments of the year—namely, NRA and the codes, PWA and public works, and secondarily national planning and large-scale low-cost housing. Beginning with the developments in business and finance, analyzed by Dr. Bernhard Ostrolenk, economist of the *Business Week*, the theme is carried into the specific fields of activity. David Cushman Coyle contributes an article on the past, present and future of the public-works idea. Wallace Thompson takes up NRA activity, and James W. Follin recounts the struggle for a basic construction code, which by good fortune we are able to present in its final and approved form in this same issue. William Green, president of the American Federation of Labor, gives labor's favorable view of the construction code, and Dr. Isador Lubin, federal commissioner of labor statistics, describes the improving but still serious condition of employment. Natonal planning, one of the challenging elements of the recovery program, is explained by Charles W. Eliot, 2nd. The crisis through which municipal finance has passed is the subject of an article by Frederick L. Bird, of Dun & Bradstreet.

On the technical side, our editorial review of events in all fields of civil engineering interest is supplemented by appraisals of contracting by N. F. Helmers, of research by Prof. F. E. Richart, of public-service engineering by W. W. Horner, and of engineering education by Prof. H. P. Hammond. Nine pages of notes on the present status of major engineering projects and five pages on the construction statistics of the year complete the contents.

The combination of broad coverage and well-qualified writers will, we hope, give the issue a value commensurate with the need it was planned to meet.

In the News:

THE EVENT OF THE WEEK was the signing of the basic construction code by President Roosevelt, bringing to a successful conclusion the most difficult code job that the NRA had to tackle. Organized labor is pleased, which augurs well for effective cooperative effort in the important task of administration that is ahead.

THE GHOST of Arizona's fight over the Boulder Dam project stalked out again last week in the form of a warning that the Parker diversion dam could not be built without the state's consent. And now the finesse displayed when the Metropolitan Water District let the contract to build the dam to the Bureau of Reclamation is quite obvious since it is no longer an interstate problem but one between Arizona and the federal government.

MUSSOLINI gave Italian engineers a good break a few days ago when it was suggested to him that the reclamation of the Pontine marshes was a miracle. He said, according to an Associated Press report, "Miracles do not exist here; what do exist are your work, the superb ability of our engineers and technicians, my will, and the capacity of the Italian people for thrift."

REPRESENTATIVES of the CWA and the New York State Federation of Labor have agreed that when skilled labor is required for CWA work in New York State, names will be taken from lists prepared by labor unions rather than from the lists of the re-employment services. Administrator Harry L. Hopkins is stated to have participated in the discussions leading to the agreement, so it may be taken as having official approval in Washington and as indicative of like agreements in all states where labor is well organized. This policy would seem to be contrary to the Recovery Act, in that it forces a man to join a union not necessarily of his "own choosing."

EFFORTS at erudition on a seal presented to the new California Water Authority for approval came to naught, according to reports, when the Latin motto "Aqua Vita Dat" was ordered changed to the less academic but more understandable "Water Gives Life."

Coming Articles:

THE SOUTHERN CALIFORNIA earthquake of last March caused $18,000,000 damage to buildings in Long Beach. A conservative estimate is that more than half this amount has already been expended on repair and reconstruction. C. D. Wailes, Jr., who, as chief building inspector of the city, supervised the work of rebuilding, has written an account of the repair methods which constitutes a noteworthy contribution to knowledge of earthquake damage and building action under earthquake forces. It will be published soon.

AN INTERESTING short-span suspension bridge has been built by American engineers for the Dominican government. It is notable as a major link in this West Indian island's new highway system, and in addition contains several interesting structural innovations. The cable saddle is sunk into the tower top, so that the intersection of the cable tangents coincides with the intersection point of the tower leg and bracing members; also the floor is of interlocking steel channels surfaced with asphalt plank. An article describing the design and construction of the bridge will be published in the near future.

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New York
February 8, 1934

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Annual Review of Engineering Progress

The New-Deal Year

IN HISTORICAL perspective it is probable that the year 1933 will be written down as the time of a great economic and social revolution, one that initiated as thoroughgoing a change as did the great revolutions of violence and bloodshed in the past. That engineering and construction were powerfully affected by the events of this revolution goes without saying, for it is now well recognized—and this is not the least of the gains in insight which the year brought to the world—that the activities of construction are close to the heart of the economic organism.

To go back over the happenings of the year would be supererogation. But it is not untimely to recall that when 1933 opened, the nation—and by and large the rest of the world—had for more than three years been struggling hopelessly in a famine of plenty, resulting from failure of the economic and financial devices of distribution, that in this time business and finance had accomplished nothing to correct the trouble, and that political government had made things worse. The people had concluded that their old leadership was unintelligent and anachronistic, and they were eager to see what course their new leaders would mark out. From this dramatic beginning the young year of 1933 worked up rapidly to a climax of financial chaos resulting from progressive failure of the banking system. Then followed deliberate, planned recovery efforts under the nation's new leadership, as reviewed in enlightening manner by Dr. Bernhard Ostrolenk, on another page.

Some High Lights

ONE OF THE vital developments of this period was practical recognition of the fact that the country's human interests are a vital public concern, a recognition crystallized in the organization of the Civil Conservation Corps, in the public-works section of the National Industrial Recovery Act, in a federal relief-dole policy, and in the Civil Works movement. Another, equally important, was acceptance of public construction as the only means of providing the employment necessary to initiate business recovery. Through this acceptance, a campaign that had been waged for several years came to a successful end. Associated with the public-works movement was a far-seeing purpose to establish a basis of intelligent planning for national development enterprises, a long-period undertaking that has made only its first beginnings so far. Finally, a fundamental attack was made on the problems arising from random industrial expansion and competition by providing, through the Recovery Act, that industry groups might cooperate. Thus, even without reference to the decisive steps taken toward financial and monetary reform and toward improvement of agricultural conditions, it is seen that an extensive program of planned and regulated economic procedure, in place of former hit-or-miss methods, marks the first year of what has been called the "New Deal." The question of how far human initiative will be affected by the change has not yet been put to test.

The Public-Works Idea Wins

A MAJOR GAIN of the year was the adoption of a public-works re-employment program. Though small in conception and halting in execution, the program represents definite acceptance of the basic idea of fighting depression crises through a wholesale campaign of public construction. For more than two years this idea had been strongly urged, at first by a very few who faced the almost united opposition of business and finance, and to some extent of politics, but later by increasing numbers of citizens, business men and finally even financial leaders who saw that dependence on so-called "normal processes" was precipitating universal bankruptcy and business paralysis. Unemployment mounting to more than fifteen million forced the conviction that something else more constructive must be done than merely operating a breadline and a dole system.

Preliminary attack on the problem by sending a quarter million young unemployed into the woods to do miscellaneous conservation work on a semi-military basis for nominal pay was followed in June by passage of a real public-works measure, which provided $3,300,000,000 for both federal and local projects, the latter to be financed by government loans supplemented by the free grant of part of the cost to equalize the increased expense due to the labor restrictions incorporated in the measure. Loans to private projects of public-use character were also provided for, following the model set by the 1932 Emergency Relief and Construction Act—which, under management of the Reconstruction Finance Corporation on a rigid banking basis with little heed to the re-employment and recovery objective, had turned out to be a lamentable failure.

Progress Delayed

FOR legislative reasons the public-works measure was joined to an industry reform measure of wholly different nature. The effect of the combination soon appeared, for the public-works section was delayed many weeks in mid-summer while attention was centered on getting the industry-control section into action. The machinery for effectuating the public-works section generally throughout the country was not in working order until the middle of September, and not until October did work start on the first few local projects. In the meantime vast sums had been taken from the public-works fund for allocation to a variety of federal projects which did not contribute much early employment. By far the largest employment aid was contributed by the $400,000,000 set aside in the Act for highway construction on a full federal grant basis.

In due course, however, the public-works section of the Recovery Act got into full swing, and through driving and highly able work at Washington as well as in the states and cities, substantially the full fund was allocated by the end of the year. Roughly 2½ billions of the total was allocated to federal projects and 800 millions to loans and grants for state and local projects. On the employment side, however, there was almost complete failure. Instead of two million men at work before winter, as planned, only 250,000 had found jobs, and 200,000 of these were on highway construction.

Obstacles to Quick Action

THE CONTRAST between objective and accomplishment of the public-works measure in respect to quick unemployment relief emphasizes some of the obstacles set up by the terms of the Act itself and by other conditions. The Act required that loans to local governments must be secured, and this meant an increase of local debt, which usually was difficult to bring about because of existing burdens on the taxpayers, and often was impossible because cities had reached their debt limits. The formalism of the operating regulations established by the PWA led to discouragement and delays of other kinds. Although efficient branch organizations were set up in each state, so many decisions still were centered at Washington as to waste much time. Even after complete project and financial data had been prepared and a loan authorized, there remained the tedious routine of legal formalities essential to completing the loan, which often consumed months. An obstacle of another kind was set up by the PWA wage and hour limits and other requirements which hampered the efficiency of planning and caused delays.

Quite aside from these elements, the PWA work revealed a serious lack of local improvement programs and systems of budgeting public construction. Relatively few projects were ready with plans and preliminaries. the depleted state of city and state engineering staffs added further to the slowness in preparing plans and project applications. Under the circumstances, the result actually achieved by the Public Works Administration in allocating the full amount of its great fund by January must be rated as a splendid accomplishment.

Civil Works as a Stopgap

A REMARKABLE EXTENSION of the public-works idea, not intended in the Recovery Act, was made in November, when it was apparent that the Public Works Administration at best could not relieve employment conditions before spring, and that growing calls for federal relief contributions meant a difficult winter. A short-time emergency system of construction employment was therefore organized under the officials of the Federal Emergency Relief Administration, to give employment to four million men until Feb. 15 by use of $500,000,000 of PWA money. This system, the Civil Works Administration, was designed to carry out small local improvement operations, quickly available and of a kind that would not otherwise be undertaken. No major construction or normally required local improvement adapted to contract procedure was to be done.

Of the four million men, the first two million were taken from relief rolls, the others from federal employment bureaus. This entire force was at work within five weeks from the actual start of employment—a result of thorough decentralization and of setting up efficient staffs of state and local officials drawn partly from relief organizations and partly from technical circles. Thus the system made a complete success in attaining its objective of providing work for a large fraction of the unemployed. Congress is certain to continue it beyond Feb. 15.

In actual operation the system developed many difficulties. The high CWA wages, equal to the PWA rates and higher than most industrial and construction wages, disturbed labor conditions. Political influence in allocating employment, "kick-backs" of wages to supervisory officials and other petty graft were detail elements of trouble. The announced purpose to keep out of normal construction was not always adhered to: a public library, two elaborate schools, a reservoir built by CWA labor, are examples of how the system in actual application competed destructively with engineers, architects and contractors.

Industry Self-Government

FOLLOWING after ruinous competition in industry during the depression years, with constant short-selling of labor and desperate attempts by every business to keep afloat and let its competitors go under, the industry-control section of the Recovery Act brought the first tangible business reform. Demands for relaxation of the trust laws had been current for a year, and the need for cooperation of industry to stabilize activity and improve labor conditions had been recognized in the Swope plan and other proposals. Out of these antecedents evolved the strange rider on the public-works act known as Title I of the NIRA. It authorizes any industrial group or division to set up with government approval a set of trade practices, or "code of fair competition", provided it also establishes a minimum wage limit and maximum hour limit and agrees to cooperate with its workers in collective bargaining.

Almost at once it developed, however, that codes of fair competition could not be drafted and agreed upon overnight, and accordingly the famous Presidential Re-Employment Agreement was drafted and laid before every employing industry and business in the country for signature—an agreement to raise wages and limit working hours pending formulation of a code, in return for the privilege of displaying the NRA's Blue Eagle, banner of a patriotic campaign to restore prosperity quickly. How the code work then proceeded, in a picturesque absence of basic policies and consistency of attitude on the part of the NRA toward different industries, is well remembered. Questions of wage-fixing, price-fixing, prohibiting or regulating the expansion of industry, open price systems, production quotas and wage differentials between different parts of the country, became the absorbing elements of public discussion.

At present, four out of five industries are under code government, employment has increased by several millions of men (though it is not known how much of this is due to natural rise of business activity), and most prices have increased markedly (under the combined influence of business increase, dollar devaluation and code costs). Complex problems of code administration and code revision are now looming up.

Construction Integrates Itself

APPLICATION of the code system gave the construction industry its supreme opportunity for the integration which it had long been seeking. Approval of the basic construction code on Jan. 31 finally establishes a constitution for such integration, and it now remains for the several divisions of engineering and construction to develop a working system of administration under this document.

Development of the code has a long history. Even before approval of the Recovery Act on June 16, individual construction groups began to draft codes. Later the Construction League offered to act as coordinating agency. The National Recovery Administration then proposed that all construction codes be grouped around a central document, and requested the Construction League to prepare it. This idea survives with slight change of form; all the partial codes are now one code, with the general provisions forming Chapter I and the separate divisions each forming a separate chapter with their specific labor provisions and trade practices.

Labor played a major part in the slow progress of this code to its recent approval. Construction is largely conducted in a free labor market, as is well known, and in many instances draws some of the best of its workers from the farm or other local occupation, while metropolitan building is unionized. To bring these diverse working conditions under one code seemed almost equally repugnant to union labor representatives and to some among the employers. Partly because of this, the code as finally drawn provides a more complex organization to deal with employer-employee relations than most others. The system as set up provides a joint planning and adjustment board for dealing with problems that will benefit from cooperative action.

As written, the code covers all construction, which means everything from Boulder Dam down to the single dwelling. Bringing together this broad range of operations presents many difficult problems. Regional agreements between labor and employers also have to be worked out. These are tasks of the next few months.

The Public's Code

FINAL APPROVAL of the construction code ushers in a day which a vast industry has long awaited. For years this industry has stood in bitter need of coordination, yet until now it succeeded only in remaining apart, a group of separate and virtually antagonistic elements. The result was continuing inefficiency, discord and dispute, bearing heavily on labor, on contractor and manufacturer and on the public.

Under the code the industry can solve its most urgent labor problems. It can wipe out the bad practices that were a permanent bar to sound and efficient existence. It can set out on a course of industry planning and direction of its operations that should lead to progressively greater stability.

Whatever the code may accomplish for the industry itself, however, it will do far more for the community at large. Construction is the great agency through which our temporary surpluses are converted into permanent wealth—through which income is transformed into capital savings. Other means of creating wealth are quite minor in comparison. The dollar that each one of us saves out of his week's pay envelope is entrusted to the construction industry as the final investment agency. And by the same token the security of that investment, the safety of our individual dime and dollar economies, depends on how well the art of construction carries out its mission. By the power of the code it can do so more capably, as well as more honestly. *It can make the thrift dollar safer.*

The members of the code authority and governing boards who are to administer the new code, therefore, have a broad public responsibility, for the code after all is the public's code. The success of their administration will be measured by the degree to which the public interest is served.

Planning a Better Country

FOR THE FIRST TIME in our national history, planning for physical, economic and social improvement is being made a prime object of study. An active and serious effort is being made to effect some degree of discipline in our heretofore uncoordinated programs of developing and exploiting the land and natural resources of nation, region and state. The Recovery Act itself made provision for a National Planning Board, about which C. W. Eliot 2nd writes so well elsewhere in this issue. In several instances the potentialities of great regional areas, such as the Tennessee Valley, are under intensive study by specially designated authorities. More than half of the states have appointed planning boards to take inventory of natural wealth, trends of industry and agriculture, and population. The mere intention of introducing intelligent order in our national future is of itself an achievement of such great significance that it cannot be allowed to pass unnoticed. But the results of such studies, the proper balancing and coordinating of our manifold development activities, are capable of bringing more national happiness than any other program in a generation. The task of appraising the present for the benefit of the future is the greatest challenge the expert planner has ever had presented to him.

Tennessee Valley Planning

MOST SENSATIONAL application of the planning concept was made even before the general provision for national planning in the public-works bill, by the organization of the Tennessee Valley Authority. Back of this undertaking is the war time enterprise of the Muscle Shoals power development, which for more than a dozen years has been substantially idle. The known underdevelopment of many parts of the country, the varied resources of the Tennessee Valley, its soil and forest problems, and the suitability of the region for experimenting with economic and industrial planning, led up to the adoption of the plan.

The TVA has specific instructions to develop power and manufacture fertilizer, in addition to a broader mandate to plan and care for the economic, agricultural, navigation and power interests of the region. There is an implied principle that the Authority should be self supporting, and it has proceeded on this basis. It is now actively engaged in building the Clinch River Dam on Cove Creek (Norris Dam) and the Wheeler Dam on the Tennessee River, as well as a transmission line from Muscle Shoals to Knoxville. It has made a contract with one or two localities for supplying power, and has agreed with some of the local utilities on a division of utility services. It is beginning on broad-gage studies and plans for improvement of agriculture, soil conservation, and development of local industry.

As the first planned large-scale economic government in the United States, the Tennessee Valley Authority easily claims rank as one of the year's achievements of long-time significance.

Housing and Homesteads

NEW HOUSING for low-wage earners and even for no-wage earners was advanced to the construction stage in a few instances, but was most notable for the interest and discussion that was aroused. In view of the opportunity available, it is a fact that progress in brick and stone is negligible as yet.

Much groundwork for a national housing policy was laid, however. Numerous states enacted housing laws, modeled on the New York act, which provided for organization and regulation of limited-dividend corporations. Others, spurred by the 30 per cent subsidy that the PWA would grant public bodies, enacted measures setting up municipal housing authorities that could build and operate low-cost housing projects. Prominent among the latter were Ohio, New Jersey and Michigan. Late in the year, when it became apparent that few limited-dividend corporations would be able to qualify for loans, the Public Works Emergency Housing Corp. was set up.

Turning to actual construction accomplishments: The Prudential Life Insurance Co. completed a development for 374 families in Newark, N. J., consisting of a row of five- and six-story buildings on either side of a city-owned park plot; Dick-Meyer Corp., in Woodside, Queens, N. Y., started a $5,000,000 development with a PWA loan; Fred F. French started his Knickerbocker Village on New York's lower east side with an $8,000,000 RFC loan; the city of Euclid, Ohio, started construction of individual homes under a special PWA loan scheme by which $1,000,000 was loaned to a municipal corporation for re-lending to lot-owners for house building.

Subsistence homesteads, for which $25,000,000 was appropriated by the PWA, come into the picture in the fall. Seven projects in six states were approved by the end of the year.

Building Activity

DRIFTING into 1933 from 1932, building activity was apparent only in the field of the federal government. Dropping to the depths with the rest of construction in April, it has since staged a remarkable comeback, aided in the main by a substantial increase in industrial building awards. The federal government continued to let post-office contracts, but commercial building, represented by stores, apartments and office structures, has scraped bottom throughout the year.

Railroad improvements in New York and St. Louis, involving off-surface tracks, stimulated industrial building—in New York, along the new elevated line of the New York Central Railroad on the west side of Manhattan, and in St. Louis along the downtown subway line of the Illinois Terminal System. In the field of industrial buildings the outdoor mercury-vapor power plant at Schenectady, N. Y., deserves mention, being completely arc-welded and involving welded trusses supporting loads of over a million pounds each.

One of the most notable commercial structures completed, which also is partly industrial, is the new building of the Cincinnati *Times-Star*. Rockefeller Center in New York added two six-story buildings to its group. In San Francisco a hospital addition marked the introduction of structural welding into that city.

The eyes of the nation were turned in March to Long Beach, Los Angeles and the vicinity, where a major earthquake took toll of many residences, small commercial buildings and schools. A result has been a new California building law prescribing earthquake-resistant construction. Long Beach also revised its masonry code, with the same end in view.

Bridge Accomplishments

ANY REVIEW of bridge-building activity in 1933 must begin with the great structures at San Francisco—the Golden Gate Bridge, with its record-breaking suspension span of 4,200 ft., and the San Francisco-Oakland or Bay Bridge project involving two 2,310-ft. suspension spans and a 1,400-ft. cantilever span. These two dominate current bridge-building as Boulder Dam dominates dam construction. But consideration of them alone gives a false picture, for 1933 was not a "big bridge year" generally.

The nearest approach to the large projects of former years is found in a group of medium-size cantilevers, of which the most notable and costly is the combination railway and highway bridge over the Mississippi at New Orleans. Considering bridge building the nation over, the bridge of modest size received comparatively more attention in 1933 than for many years. Bridge strengthening and redecking were especially active fields. At Seattle a steel open-mesh deck was installed on an existing double-leaf bascule. At Pittsburgh a battledeck type floor of structural aluminum with new aluminum floor beams and stringers was used to increase the capacity and useful life of the famous old Smithfield St. Bridge. Other redecking jobs involved steel grids filled with concrete and interlocking steel channels with asphalt-plank wearing surfaces. Even the historically troublesome floor of the Queensboro Bridge is to be improved.

Of structures representing interesting or novel designs, there are several of note. A three-level grade-separation of highways and of railways in Newark, N. J., involves a flat slab 32 in. deep with the edges carried over the exterior supports and turned down to be loaded with backfill. In Missouri, a self-anchored suspension bridge was opened. A long deck-girder structure in Dresden, Germany, became the largest welded bridge, in point of steel tonnage involved. Continuity found expression in steel trusses and in concrete and steel girder bridges. Interesting examples of the latter involved rolled girder-beams. The Brooklyn Bridge had its 50th birthday and was "re-opened" with ceremony.

Two bridges of note are under construction in Europe, one in Denmark and one in Sweden. The Danish structure will connect the islands of Zealand and Falster and is known as the Storstrom Bridge. It will be the longest bridge in Europe, about 2 miles from end to end, and consists of 47 steel deck truss spans of about 200 ft. each, and three through steel arches, two of 340 ft. and one of 450 ft. In Stockholm a hollow-type concrete arch has been completed across Traneberg Sound. Its span of 593 ft. makes it second in length only to the arches of the bridge at Brest, France, which have a span of 612 ft.

Structural Advance

INVENTION and ingenuity, thriving on adversity as they characteristically do, provided a normal amount of structural advance even in a terribly depressed year. Also, the A.S.T.M. put into practice its new specifications for structural steel, raising yield point and ultimate strength requirements, and the American Welding Society adopted a specification that gives full play to the commercial development of coated and covered welding rods. Prompted by school building and other failures in the Southern California earthquake, a new and stringent state building law, requiring provision for lateral forces, was enacted by the state legislature. The strong-motion seismographs of the Coast & Geodetic Survey received their initial test in the earthquake and produced records for the first time that give the structural engineer some idea of the acceleration, period and amplitude of vibrations near the epicenter of an earthquake. Studies of analytical methods of earthquake design were stimulated by the Long Beach disaster.

Developments in structural timber were prominent. Connectors of dowel rings or plates countersunk in the face of timber members at the joints of trusses, to transfer loads in bearing and shear, were promoted and found expression in several substantial railway trusses in the Northwest. Finally, a composite timber-concrete deck was developed in which triangular steel plates projecting from the timber into the concrete permit the development of high horizontal shear resistance.

Welded plate columns, in cylindrical and ellipsoidal cross-sections, were adapted to use as tower columns for elevated tanks. Structural aluminum floor beams and stringers and an aluminum battledeck floor were used on the Smithfield St. Bridge in Pittsburgh. Extensive use of the X-ray for inspecting welds was recorded at Boulder Dam in connection with the fabrication of the thick-plate penstock pipe.

Structural model testing reached a new high with the work done at Princeton on a stainless-steel model of the Golden Gate Bridge tower. Successful construction and operation of the Skyride transporter bridge at the Century of Progress Exposition was a tribute to model testing work, which formed a conspicuous part of the design procedure. The structure itself was notable as containing a rope-cable stiffening system and the largest assemblage of ropes prestressed to exact length that has ever been used.

Deep Foundations

BRIDGE-PIER SINKING during the year entered a new range of depths for work in this country and, with the exception of a caisson sunk in the '80's for a bridge at Hawkesburg, Australia, in the world as well. Three separate structures were involved, two in the South and one on the West Coast. In the Atchafalaya River at Morgan City, La., a pier was completed to a depth of 176.5 ft. below water level. At New Orleans, on the Belt Bridge over the Mississippi, four piers are being sunk to El. —170. On the San Francisco-Oakland Bridge two of the piers will come to bearing at an estimated depth of more than 220 ft. below mean low water.

Improvements in caisson details, utilization of modern construction methods and, in one case, a new departure in caisson design, contributed to these achievements. The artificial-sand-island method is being used at New Orleans. At Morgan City, an unusually unstable river bottom was pierced with a circular steel caisson with a single central dredging well, the operations being protected from tidal currents by a steel sheet-pile cofferdam. The San Francisco caissons, each composed of groups of 21 to 55 steel cylinders capped with domes and operated on the diving-bell principle until landed, and thereafter open-dredged to bearing, represent a new development that has proved successful.

Power Development

INTEREST in water-power development, after flagging for two or three years, was revived during the year, first by the establishment of the Tennessee Valley Authority and then by the financing through the PWA of the Bonneville and Grand Coulee power projects on the Columbia River. Considered in connection with the power development at Boulder Dam and the possible power development in the international section of the St. Lawrence River, the Tennessee and Columbia River power projects make it possible to set up in the four corners of the country government-controlled power systems as a standard against which to measure service by private utilities.

Announcement of the inauguration of these power projects was bad news for the electric utility companies. In no one of the four regions is there any excess of demand over supply, and in each the private companies have plans laid for meeting the demands of normal growth. Unless phenomenal growth in demand occurs, there will be no market for much of the power from the government plants unless they can take business from the private utilities. The character of the new competition was, therefore, a subject of much concern for the private companies. That it will not be highly destructive is indicated by the fact that in the Tennessee Valley, the only place where the competition was of immediate interest, the TVA approached the power companies with a proposal that the territory be allocated as far as possible, and late in the year made an agreement as to territories to be served initially by the TVA. Looking farther ahead, the government is planning actively to stimulate the use of electricity in the Tennessee Valley in order to build up a demand sufficient for both public and private plants.

On the technical side of power development, the year was marked by the placing of orders for the first turbines for the power plant at Boulder Dam. These are the world's largest turbines—82,500 kva. each. Notable also are the welded steel penstocks and the gates for the intake towers. The year also saw the start of construction of Boulder Dam itself; by the end of the year a million yards of concrete had been placed.

Flood Control

NEW IMPETUS was given to flood-control and river-regulation projects during the latter half of the year by the Public Works Administration through the initiation and financing of several large projects. They include partial regulation of the Missouri River by a dam at Fort Peck, Mont., work on the Sacramento River in California, an elaborate scheme for flood control and river regulation in the Muskingum River Valley in Ohio, and one dam of a group proposed for regulation and flood control on the headwaters of the Ohio near Pittsburgh, Pa. Of these, the Fort Peck dam is the most notable in view of its great cost (about $70,000,000), because it is indicative of the government's willingness to invest large sums in regional development work. Along the Mexican border, flood-control work has been undertaken at Nogales, and recently both the United States and Mexican governments have provided money for the channel stabilization work on the Rio Grande at and just below El Paso, agreed to in a treaty signed early in 1933.

Work on the lower Mississippi flood-control program is rapidly nearing the objective of the current plan. Significant innovations in channel stabilization work are found in the six cutoffs opened during the year. The remarkably encouraging results obtained in model studies carried on at the Vicksburg waterways experiment station are notable additions to the art.

Reclamation and Irrigation

IRRIGATION is better off than it was a year ago, but aside from small areas devoted to special crops the irrigated farm regions are in the same boat with other agricultural regions, which means that they are still hard up. Despite this, a vast new program of federal irrigation investment was entered upon by virtue of bountiful allotments of funds by the PWA. In 1933 the Reclamation Bureau received more money than it had during the first two decades of its history; about half of the total of the $200,000,000 will be spent or committed through contracts before July, 1935. There is little new land included, however, for most of the projects of the list (aside from the Grand Coulee power scheme and Boulder Dam) are either salvage or supplemental-water undertakings.

Gradual bettering of agricultural prices has tended to relieve the severe financial strain on existing irrigation developments. The insistent demand of the districts for reduction in the bonded debt has lessened, although in many cases readjustment will still be necessary where the obligations were incurred under peak prices. This condition does not differ from that affecting other agricultural sections, except that the debt hangs over a group rather than individuals. Negotiations can now be carried forward in a somewhat less hysterical mood, with the irrigationists a little less sure that the bond holders are intent on getting blood from turnips, and the latter not so positive that the farmers aim at the repudiation of all debts.

Waterways

INLAND waterway development also was stimulated by the PWA. In addition to large allotments for continuation of the normal program of river and harbor work, $33,500,000 was provided for speeding up completion of the 9-ft. waterway on the upper Mississippi, and $17,753,000 for slack-water navigation on the Missouri. This was done without approval of these projects on the part of Congress, as has also been the case with many other federal projects to which the PWA allocated funds. Accordingly, these two navigation improvements do not mean definite adoption of the waterway development policy which they represent.

During the year the Illinois waterway was opened to traffic, thus making it possible for modern barges to travel between the Great Lakes and the Gulf. The treaty between the United States and Canada providing for construction of the St. Lawrence waterway was signed during the year and now is before the Senate for ratification. No action on it has been taken by the Canadian Parliament. Navigation on the Cape Cod Canal is to be improved by the construction of high-level highway bridges and a new low-level lift bridge for the railroad crossing. A proposal to build a ship canal across the upper end of the Florida Peninsula to shorten the distance between Atlantic and Gulf ports is before the PWA for financing if approved.

Transportation

NEW EMPHASIS on the need for coordination of all forms of land transport, rail, motor and barge, was the most significant transportation development of the past year. In February the National Transportation Committee submitted its report summarizing the evidence in favor of such coodination. Subsequently Congress set up the Railroad Coordinator as a preliminary to legislative action on that element of transportation. His first report was submitted to Congress recently.

One significant statement of the National Transportation Committee was re-emphasized throughout the year by the continued financial difficulties of the railroads. It said that railroad rates should not be based upon the value of the property dedicated to transportation service but upon the cost of rendering efficient service. That was a bitter pill for those who held that the present capital structure should be maintained at all costs, for it obviously means drastic reorganization of many capital structures. Now the Railroad Coordinator urges upon Congress the need for facilitating such reorganizations as one way of improving transportation conditions. Store-door delivery inaugurated by the railroads, to hold business being lost by trucks, and stabilization of bus and truck operations through the application of industry codes mark progress toward a solution of the difficult problem of coordinating rail and motor transport.

In contrast to the sluggishness in most lines of railroad development, notable progress was made in the construction of light-weight streamline cars for high-speed service; several such cars have been put in service and others will shortly follow.

Roadbuilding Falls Off

CARRYING ON from the emergency loans of 1931 and 1932, roadbuilding became largely a federally financed and controlled activity in 1933. Highway expenditures by counties and municipalities, which in predepression years amounted to about $300,000,000, were reduced to little more than enough for routine maintenance. State funds for roads, depleted by a diversion of about $200,000,000 for direct relief and other non-highway uses, amounted to about $276,000,000 less than in 1932. To meet these decreases there was available a carryover from the $120,000,000 emergency federal loan of 1932, and the Recovery Act appropriation of $400,000,000 to be spent in 1933 and 1934. Naturally only a minor part of the Recovery Act fund, some $75 millions, actually went into pay rolls of 1933; but considering half of the fund as nominally to be credited to 1933 roadbuilding it falls far short of making up the decrease in state and local road funds. The significant fact of the year's roadbuilding, however, was not that so large a part was financed by federal money but that this financial set-up greatly extended federal control over state highway activities.

Further, with the 1933 season the system of federal aid to roadbuilding, as it was begun in 1917 and continued through 1932, ceased to exist through abandonment of the restriction of federal funds to the trunk-road network. A large part of the year's special allocation was earmarked for use on secondary roads and municipal thoroughfares. This step may mark the beginning of absorption of the entire road system into a unified, federally controlled network.

Refuse

THE PRINCIPAL DEVELOPMENT in garbage and refuse collection and disposal has been financial, a trend toward a deferred-payment contract basis. Detroit tried unsuccessfully to get per-ton bids for seven years, at the end of which time the plant was to revert to the city. Baltimore was successful in getting a $5 per ton bid and will own the plant after ten years.

The Supreme Court extended to July 1 the time in which New York may continue to dump garbage at sea, after which the city must cease or pay New Jersey $5,000 per day; PWA has allotted $4,000,000 for incinerators. New incinerators have been built or contracted for at Cleveland, Portland (Ore.), Garden City (N. Y.), and Baltimore, the last of 600 tons per day, costing $700 per ton-per-day capacity. Considering recent bids too high, New York City took over the ash collection and disposal from a private contractor. Only the smaller of the two Washington incinerators (completed late in 1932 but not tested until 1933) has operated because no appropriation was made.

Water Supply

COMPARED WITH the extremely limited accomplishments of the nearly lifeless months of 1932, the volume of water-supply improvement in 1933 appears creditable, as the statistics show an increase of nearly 100 per cent over the previous year. But the figures are deceptive, for when the Colorado River Aqueduct is deducted it is found that waterworks activity continued the decline that began in 1928.

The bulk of the past year's work was made possible by the financial operations of the ill-starred RFC, which provided a total waterworks fund of about $60,000,000 during its existence as a financial agency for public works. The PWA succeeded to its role in the late summer and was able before the close of the year to allot another $50,000,000 to waterworks improvements. That sum, however, represents a construction volume in the neighborhood of $85,000,000, for a great many of the waterworks applications asked only for the federal grant and made no request for loans.

Technically, waterworks engineering was featured by a continuing interest in the improvement of pipe lines. For example, the increasing acceptance of fusion welding as a method of steel pipe-line fabrication was signalized by the construction of two long welded lines, one in Pennsylvania and one in Washington. Further, a spiral-welded steel pipe became available for use. Pressure pipe composed of a mixture of cement and asbestos, which has been used abroad for some time, appeared on the domestic market and went into several installations. Pipe coatings and linings have been used in increasing extent.

In water purification quality refinement continued to dominate the field as it has done for some years past.

Sewerage and Sewage Treatment

DESPITE the fact that because of financial limitations the amount of sewerage work undertaken during 1933 fell short of even the pitifully low figure of 1932, at the present time sewerage and sewage treatment comprise one of the livest topics in the field of public-improvement construction. One major reason is that there is an awakening of interest on all sides in improving general sanitary conditions. This new appreciation was reflected in the drafting of the Recovery Act, which placed sanitary improvements in a favored category and refrained from requiring, as the RFC law did, that financing be based on the pay-toilet principle. Stimulated in several cases by court decisions, applications to the PWA for sewerage loans were numerous; by the end of the year more than $100,000,000 had been allocated for works of this nature.

The relative youth and consequent rapid development of sewage treatment also accounts for the great amount of technical activity observed in that field. Outstanding among the developments during the past year were the advances made in the utilization of chemicals and the introduction of sludge-gas as a source of mechanical power. The chemistry of coagulation has been studied intensively and the laboratories have yielded information of considerable value to the plant operator; a much better appreciation is now at hand of the rightful place of chemical treatment methods; experimental or demonstration installations of new processes have been carefully observed. The energy in sludge gas has been put to widespread use for several years for heating digestion tanks, and during the past year it has been used at several activated-sludge plants for driving gas engines to supply compressed air to the aeration tanks.

In early February a long-awaited trial-court decision was announced in the activated-sludge patent case. The federal court at Milwaukee decided that the patents on the activated-sludge process were valid and had been infringed by the city of Milwaukee. Milwaukee promptly appealed. Arguments before the appellate court were heard late in the year but no decision has as yet been announced. A similar suit against Chicago, tried in that city, has been subject to further delay.

Professional Codes

THE SUBJECT of codes for the two major professional groups in the construction industry—architects and engineers—came up early in the preparation of the construction industry code. At first, both because of a general feeling that there was no special need for a code for these two groups and because of a ruling by counsel for the NRA that professional classes do not come within the provisions, the Recovery Act, which had been the motive for codes for architects and engineers, was put aside. But it soon became evident that it would be difficult if not impossible to correct some of the evils of the construction industry without having architects and engineers bound by the same general regulations that applied to general contractors and others in the industry. Also, it developed that both professions needed to come into the general organization being set up to draft and administer codes in order to protect their own interests. As a result, the American Institute of Architects and the American Society of Civil Engineers undertook to prepare codes for their respective professions.

Progress in the preparation of the engineers' code was discouragingly slow, despite the great amount of work put into it, due chiefly to the changing requirements of the administrators of the Recovery Act. The engineers' code came up for a public hearing in October, but since that time it has been subject to repeated radical revision, again chiefly on account of changes in NRA requirements. The most recent NRA redraft is a fantastic composite of rules that attempt to cover even so-called "sales engineering."

Wage Problems

THE CODE STUDIES brought to the forefront the subject of wages for employed engineers. In prosperous times few employed engineers were adequately paid; during the past three years the general reductions in pay made difficult the position of even those engineers who were able to hold their jobs. Wide unemployment coupled with exploitation of men who would work for almost anything in order to get a job added to the general discontent. It was natural, therefore, that those who had suffered should look to the NRA codes as an opportunity to raise wages to decent living standards and to cut down on long hours. Old unions of technical men were revived, and at least one new one was organized to represent engineers and engineering assistants in the code studies and in collective bargaining with employers after the engineers' code is approved. Results to date have been small. In the first place, NRA codes do not apply to federal, state and municipal employees; in the engineering field they apply only to engineers in private work, a relatively small part of the total, and of these the engineers in manufacturing plants are covered by the codes for the industries for which they work. A further complication is the NRA ruling whereby only minimum wage rates and maximum hours can be set except in highly organized industries, where scales other than the minimum may be included if agreed to by employers and employees. After the construction codes are approved, regional code authorities may set up wage rates and hours for the higher classifications through collective bargaining. As this is not mandatory, progress may be slow.

Licensing and Employment

ASIDE from codes the only other professional development of special significance was inauguration, after a year's preliminary study, of the Engineers' Council for Professional Development as an approved body representing the major engineering groups in matters relating to the advancement of the profession, including student guidance, improvement of educational work and the coordination of the development work of the major engineering societies.

Twenty-seven states now have some form of registration law for engineers, Ohio having been added during the year. Registration laws are being promoted in most of the remaining states.

Employment conditions changed little for the profession from 1932 until toward the end of the year, when a considerable number of unemployed engineers began to be taken up by the expanded work of the Coast and Geodetic Survey under the Civil Works Administration. Despite wide unemployment and curtailed income, interest in society meetings and other professional activities has kept up surprisingly well.

Contracting

CONTRACTORS have passed through a difficult year, in which many fell by the wayside. The unprecedentedly low volume of work made competitive conditions extremely bad, though in general bids were more nearly at cost than in the previous year. During the six-month struggle to formulate the construction code, extending into the current year, organized relationships were badly disrupted by the uncertainty of coming code practices. Uncertainties as to what the separate codes for materials and equipment would do to prices and marketing practices added to contracting difficulties. Also, the requirements of the Public Works Administration with respect to public and private work financed by it imposed new and trying restriction on contractors, especially as to labor conditions. For the first time contractors had little to say about their working personnel. Established working organizations had to be thrown overboard and men hired from designated agencies, which put many inexperienced and incapable workers on the job, often without improving the volume of employment, since the contractor's regular force became unemployed. Job costs became difficult to determine in advance, accidents and inefficiency disrupted working schedules.

Contracting looks forward to a more active and less hazardous period in 1934. Public-works contracts will be let in considerable measure. Materials prices have steadied under various codes, which makes bidding a little less of a gamble. Signing of the construction code promises much-needed stabilization measures for the industry. There is now a chance to fight bid shopping and the "kickback" racket. Definite labor relations are provided for. Yet the harassing regulations of the PWA will continue to make the contractor's lot something less than pleasant.

The Changing Construction Picture

Statistics for 1933 reveal record lows and a heartening recovery in materials prices, wages and employment, with contract volume at $2,440,000,000 — Uncontracted PWA financing provides billion dollars backlog for 1934

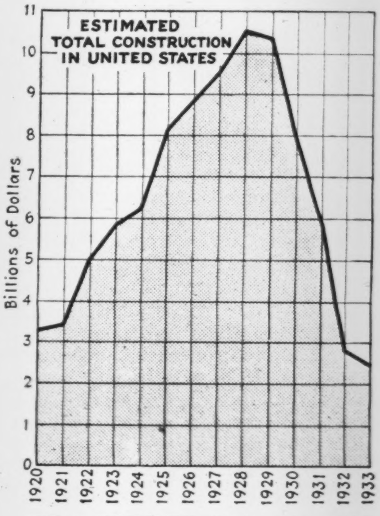


FIG 1—ESTIMATES of the volume of all construction place the 1933 total at less than 2.5 billions, 86 per cent of the 1932 volume and only 23 per cent of the 1928 peak. The low volume is piling up billions in the construction deficit.

CONSTRUCTION in 1933 failed to follow the upward trend of general business, dropping to 86 per cent of the 1932 volume. Since 1928, the all-time peak of construction in this country, the volume has steadily declined until last year's activity amounted to only 23 per cent of the 1928 total. Indications at the beginning of 1933 pointed to a 10 per cent loss from the previous year's construction volume, a prediction that proved remarkably accurate. The estimated total of all construction for the year is 2.4 billion dollars, as compared with 2.8 billions in 1932 and 10.5 billions in 1928.

Private engineering construction showed a slight gain for the year, though residential losses offset this gain, bringing the year's total of private work slightly lower than for the previous year. Practically all the construction loss of 1933 was in public works, with a six-month shut-down on federal construction as a heavy contributor. The construction activity curve, represented by contract awards, dropped swiftly from January to March, the low point of the year, recovered somewhat during the next three months, dropped again in July and then rose steadily to October, the highest month.

The construction activity at the first of the year was due to the influence of RFC financing. The June rise was seasonal without the aid of artificial stimulation. By August, construction began to feel the effects of PWA financing in the highway field. Federal work became active at the same time. Very few non-federal PWA projects, excluding highways, reached the contract stage, though $658,000,000 was authorized.

TABLE I — ESTIMATED DOLLAR VALUE OF ALL CONSTRUCTION IN UNITED STATES
(Millions of Dollars)

	Residential	Public Works	Other	Total	ENR Cost Index
1919......	1,106	1,640	740	3,540	198.42
1920......	706	1,470	1,204	3,380	251.28
1921......	1,100	1,510	860	3,470	201.81
1922......	1,675	1,780	1,445	4,900	174.75
1923......	1,980	2,300	1,590	5,870	214.07
1924......	2,120	2,500	1,610	6,230	215.36
1925......	2,704	2,476	2,998	8,178	206.68
1926......	2,676	2,670	3,532	8,878	208.03
1927......	2,544	3,073	3,978	9,595	206.24
1928......	2,796	3,480	4,304	10,580	206.78
1929......	1,934	3,263	5,180	10,377	207.02
1930......	1,103	3,363	3,592	8,058	202.85
1931......	812	3,098	2,020	5,930	181.35
1932......	281	1,918	640	2,839	156.97
1933......	249	1,533	658	2,440	170.28

TABLE II — ESTIMATED VALUE OF ALL CONSTRUCTION BASED ON 1913 COSTS
(Millions of Dollars)

	Residential	Public Works	Other	Total	ENR Volume Index
1919......	585	825	373	1,783	98
1920......	281	586	480	1,347	99
1921......	547	750	427	1,724	96
1922......	960	1,020	830	2,800	147
1923......	925	1,072	743	2,740	146
1924......	987	1,160	743	2,890	154
1925......	1,314	1,203	1,454	3,971	201
1926......	1,286	1,280	1,745	4,311	228
1927......	1,246	1,496	1,933	4,675	263
1928......	1,351	1,691	2,080	5,122	287
1929......	935	1,575	2,496	5,006	317
1930......	544	1,654	1,770	3,968	260
1931......	448	1,705	1,114	3,267	220
1932......	179	1,222	408	1,799	127
1933......	146	900	386	1,432	102

Production of construction materials last year followed no common trend. Steel ingot and lumber production increased, while cement and structural steel output showed losses as compared with 1932. Prices of construction commodities strengthened in all lines.

Construction wages during the year reversed the three-year downward trend, with common wages coming back to 1931 levels and skilled wages regaining most of the loss suffered in 1932. Influence of PWA scales was felt in common wages. Employment in construction reached a long-time low last spring, but recovered somewhat during the closing months of the year. Unemployment in construction is still much greater than in most other fields.

Total construction volume

There is no way to determine the exact total value of all construction in the United States. From figures compiled by *Engineering News-Record* and other agencies, the 1933 volume is estimated at $2,440,000,000, or 86 per cent of the 1932 total, estimated on the same basis of $2,839,000,000. Making up the 1933 volume is $249,000,000 in residential work, $658,000,000 in other private construction and $1,533,000 in public works. Table I gives the estimated totals since 1919, and they are plotted in Fig. 1. Based on 1913 costs, the

FIG. 2—THE WEEKLY AVERAGE of contracts let per month is an excellent barometer of construction activity. Private construction made sporadic attempts in 1933 to rise out of the low depths to which it sank in 1932. Public works were influenced by PWA financing.

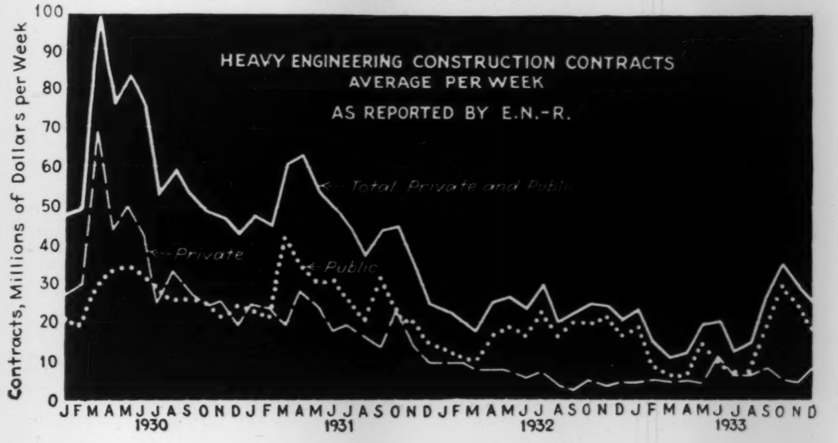


TABLE III — ENGINEERING CONSTRUCTION CONTRACTS REPORTED BY ENR IN 1933
(Thousands of Dollars)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States 1933	United States 1932	Canada 1933	Canada 1932
Public Works										
Waterworks	3,283	3,651	1,225	8,015	3,872	47,217	67,263	34,586	3,731	5,120
Sewers	2,445	3,455	3,255	6,565	5,329	1,126	22,175	24,613	2,173	1,676
Bridges, public	4,660	14,114	4,305	5,953	10,897	40,961	80,890	79,557	5,070	3,960
Earth work and waterways	2,460	10,734	30,353	23,636	46,428	22,963	136,575	101,251	482	872
Streets and roads	18,181	48,575	38,939	53,503	82,637	46,423	288,258	379,937	9,186	14,626
Buildings, public	6,913	52,233	16,451	7,878	23,007	14,679	121,161	240,627	1,905	5,834
Unclassified, public	1,378	5,817	2,178	1,150	2,797	9,497	22,817	38,014	1,385	2,763
Total public	39,320	138,579	96,707	106,700	174,967	182,866	739,139	898,585	23,932	34,851
Federal gov't. (included in above classifications)	6,308	37,356	48,733	27 738	62,935	34,110	217,180	270,866	.....	.....
Private										
Bridges, private	......	11,665	1,326	443	3,242	265	16,941	4,275	.....	.....
Buildings, industrial	11,734	53,497	19,427	26,678	25,650	15,390	152,376	93,064	7,488	6,350
Buildings, commercial	6,309	79,666	2,959	8,425	6,708	2,332	106,399	166,296	3,321	3,954
Unclassified, private	1,231	15,074	3,569	8,447	14,728	10,465	53,514	57,089	665	1,461
Total private	19,274	159,902	27,281	43,993	50,328	28,452	329,230	320,724	11,474	11,765
Total — 1933	58,594	298,481	123,988	150,693	225,295	211,318	1,068,369	....	35,406	......
Total — 1932	71,636	403,830	127,815	205,423	236,205	174,400	......	1,219,309	.....	129,816

physical volume of 1933 construction is equivalent to only $1,432,000,000, as shown in Table II.

ENR contract award statistics, which exclude residential building, provide an accurate picture of the trend of heavy engineering construction. These figures are confined to contracts above certain minimum amounts for various classes of work, but as their coverage is nation-wide and is consistent from year to year, they give dependable comparisons. The following discussion of contract awards, unless otherwise noted, is based on compilations from our own coverage.

The total of *ENR* engineering construction reports for 1933 was $1,068,000,000, segregated into six geographical districts, as shown in Table III. Public-works contracts aggregated $739,139,000, while private construction amounted to $329,230,000.

Gains over 1932 were recorded in private, waterworks, bridges and industrial buildings (Fig. 3). Public works, which made up 69.2 per cent of the 1933 volume, amounted to 82.2 per cent of the 1932 total for this class. Private work showed a gain of 2.5 per cent for 1933, mostly in industrial buildings, which increased 64 per cent over 1932. Commercial buildings, formerly the bulwark of private construction, dropped 36 per cent to $106,399,000.

While highway construction led public works in 1933, with lettings totaling $288,258,000, this class of work showed a loss of 24 per cent as compared with 1932. The next highest class, earthwork and waterways, mostly federal, amounted to $136,575,000, a gain of 35 per cent over the previous year's volume for this class. Waterworks contracts almost doubled last year, amounting to $67,263,000, of which more than $45,000,000 was for California work, principally for the Colorado River aqueduct. Public building contracts, largely federal, were only half of the 1932 total, amounting to $121,161,000. Federal construction of all classes ended the year with a loss of 20 per cent over the 1932 value.

The weekly average of contracts awarded each month is an excellent barometer of construction activity. A four-year record of weekly averages of contracts reported by *ENR* is shown in Fig. 2. The total-value curve shows the depths to which construction sank last March—slightly over $10,000,000 per week. Another low point was recorded in July, just before the public-works program got under way.

Geographical distribution

A geographical analysis of contracts let the past four years shows a definite swing in construction activity away

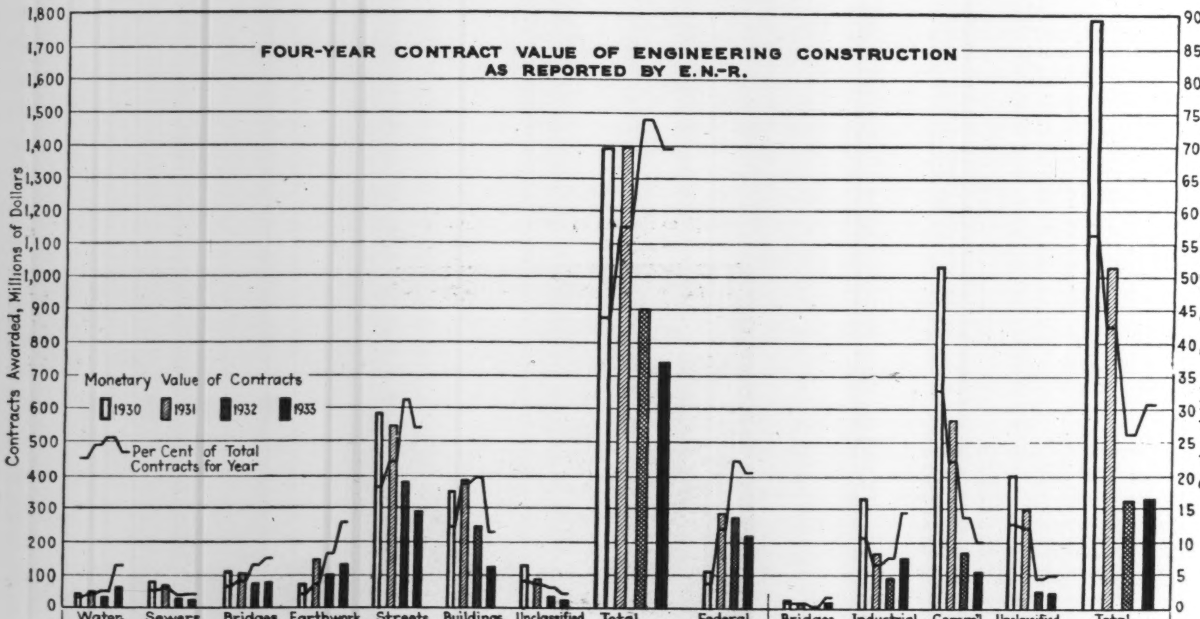


FIG. 3—CLASSIFICATION of construction contracts reported by *ENR* indicates how the various items have fared during the depression years. The percentage curves show how the classifications vary in relation to the total of all contracts.

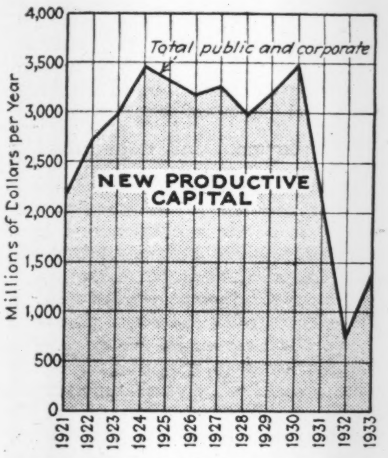


FIG. 4—THE FIRST BREAK in the downward trend of components of construction comes with an upturn in new capital figures. The PWA is responsible

from the East to the South and West, with the Middle West holding its own in proportion of the country's total. This swing is shown in Fig. 5.

In comparing 1933 construction with 1932 volume, the Far West registered a gain of 21 per cent, while the South and West of Mississippi areas showed slight losses of 3 and 4.5 per cent, respectively. New England construction declined 19.5 per cent in 1933, while greater losses of 26 and 26.5 per cent were shown by the Middle Atlantic and Middle West areas, respectively.

Building permits continue decline

Building permits reached their peak in 1925, amounting in that year to $4,300,000,000 and since then have steadily dropped. The 1933 value for 354 cities, as reported by the *Commercial and Financial Chronicle*, was the lowest in the history of its compilation, $362,954,000.

Construction financing

Most of the construction financing of the past year was done by the federal government through RFC and PWA loans and grants. In 1932 the RFC agreed to finance self-liquidating projects aggregating $147,000,000. Of this amount only $18,000,000 in construction bonds was actually purchased that year, leaving $129,000,000 in commitments to be taken up at the start of 1933. Some of the projects under commitment have been abandoned; others have been deferred. The RFC purchases of bonds in 1933, plus regular state and municipal productive issues sold in open market, amounted to only $277,000,000 for the year. PWA loans and grants to states and municipalities, including allotments for which bonds have not yet been purchased, amounted to $813,700,000 for the year, bringing the total public construction financing up to $1,090,700,000 (Fig. 4). Included in this amount is the $400,000,000 federal highway money. The total is about double the public construction financing of the previous year. The municipal bond market improved considerably last year.

Private construction financing, except for PWA loans, was negligible, amounting to less than $55,000,000. PWA allotments to private construction projects amounted to $237,322,000, of which $48,572,000 was for housing, $182,808,000 to railroads and $5,942,000 to other corporations. Public and private new productive capital, including PWA allotments, totals $1,382,900,000 for the year, as compared with $720,000,000 for 1932.

From the $3,300,000,000 PWA fund, nearly two billions were allotted to federal agencies. This is exclusive of the $400,000,000 highway fund, which is carried in government reports as federal, but which is listed as state financing in *ENR* figures because of its administration by state agencies. Of the total allotments to federal work, $562,000,000 was for straight construction work, another $100,000,000 was set aside for federal housing projects, while $800,000,000 was allotted to projects that border on construction work, but cannot be considered strictly as such. In the latter class are the CWA, shipbuilding and geological survey allotments.

Of PWA funds allotted to construction purposes, it is estimated that projects aggregating $1,200,000,000 are yet to reach the contract stage, providing the largest reservoir of construction funds that has been available for three years.

Construction costs rise

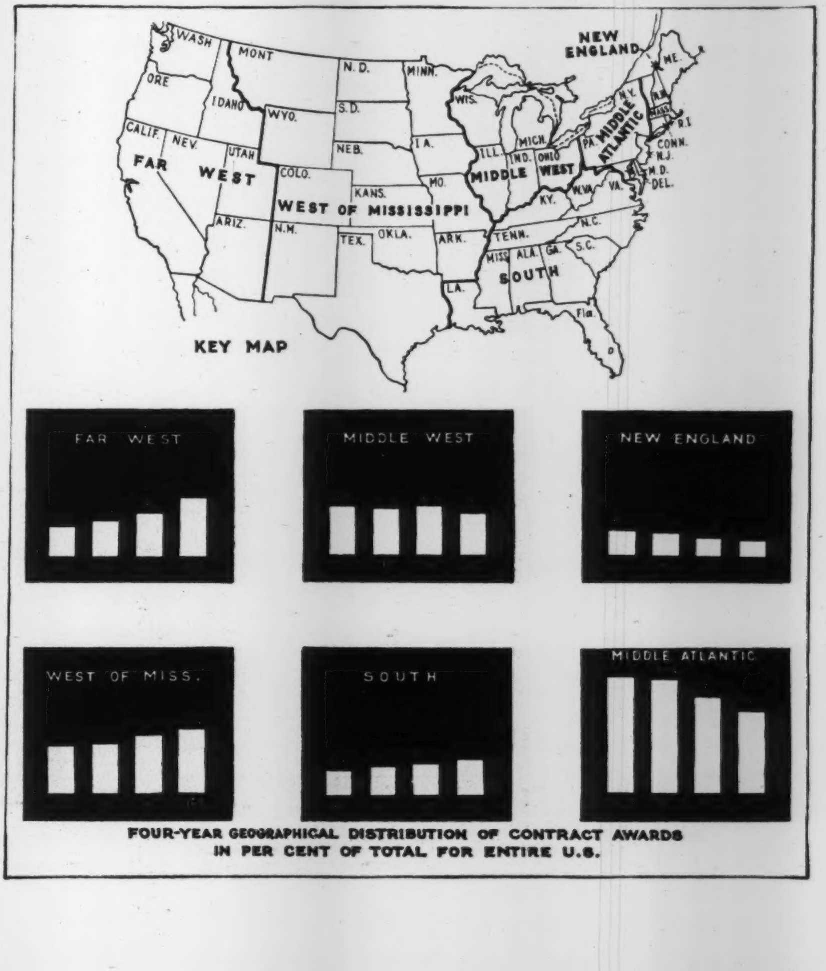
The *ENR* construction cost index has shown a consistent rise since June, 1932, when a sixteen-year low point of 152.20 was reached. At the start of 1933 the index stood at 158.44; at the

TABLE IV — CORPORATE, STATE AND MUNICIPAL FINANCING
(Millions of Dollars)

	Total Financing Incl. Refunding*			New Productive Capital		
	Corporate	State and Mun.	Total	Corporate	State and Mun.	Total
1925	$4,222	$1,400	$5,622	$1,966	$1,352	$3,318
1926	4,574	1,365	5,939	1,824	1,344	3,168
1927	6,507	1,510	8,017	1,784	1,475	3,259
1928	6,930	1,425	8,345	1,568	1,379	2,947
1929	9,376	1,431	10,807	1,758	1,418	3,176
1930	4,757	1,487	6,244	2,032	1,434	3,466
1931	2,371	1,256	3,627	787	1,235	2,022
1932	643	849	1,484	159	561	720
1933	380	520	900§	292†	1,091‡	1,383

*From Commercial and Financial Chronicle.
§PWA Financing not included.
†Includes $237,000,000 PWA loans.
‡Includes $814,000,000 PWA loans and grants.

FIG. 5—THE SOUTH AND WEST are accounting for a greater proportion of the country's construction volume, at the expense of the East. The key map shows the division of the country into districts for *ENR* compilation of contract awards.



close it was 192.14, the highest since March, 1931. The largest monthly gain was September-October, 1933, when the index jumped 12.26 points.

The index from 1913 to date is plotted in Fig. 7, along with details of 1933 and the quarterly average of the *ENR* construction volume index.

During the preparation of the materials codes, many prices were unsteady. Labor rates also were uncertain, because of unemployment conditions, though the PWA scales in the latter part of the year steadied the rates in some quarters. While contractors seemed to be bidding better prices than a year ago, they were still taking chances on labor and materials, keeping contract prices below apparent costs figured from quoted materials prices and published wage scales.

Employment and wage rates

General employment in 1933 was at a higher rate than in the previous year, though as a whole construction labor fared worse because of the almost complete lack of work in the early part of the year. The employment trend of four classes of workers is plotted in Fig. 8. The curves in this chart show that factory employment gained considerably in 1933, and all union trades fared even better. Gains made by building-trades workers in the last half of 1933 hardly made up for the loss sustained earlier in the year. The Ohio index of construction employment showed a sharp increase in the second and third quarters but did not rise above the October, 1932, level.

FIG. 6—ALL CLASSES of labor rates rose above 1932 levels by the end of 1933, but a decrease in working hours held down the weekly income of individuals.

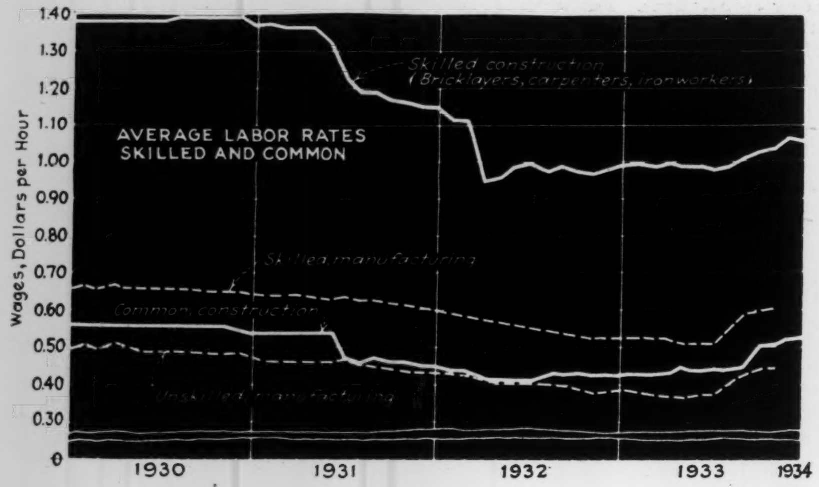


FIG. 7—RISING materials prices and labor rates pushed up the construction cost index to early 1931 levels during the final quarter of 1933. The volume index curve shows there is little relation between construction costs and volume. The Aberthaw index represents the cost of a typical reinforced-concrete factory building in New England.

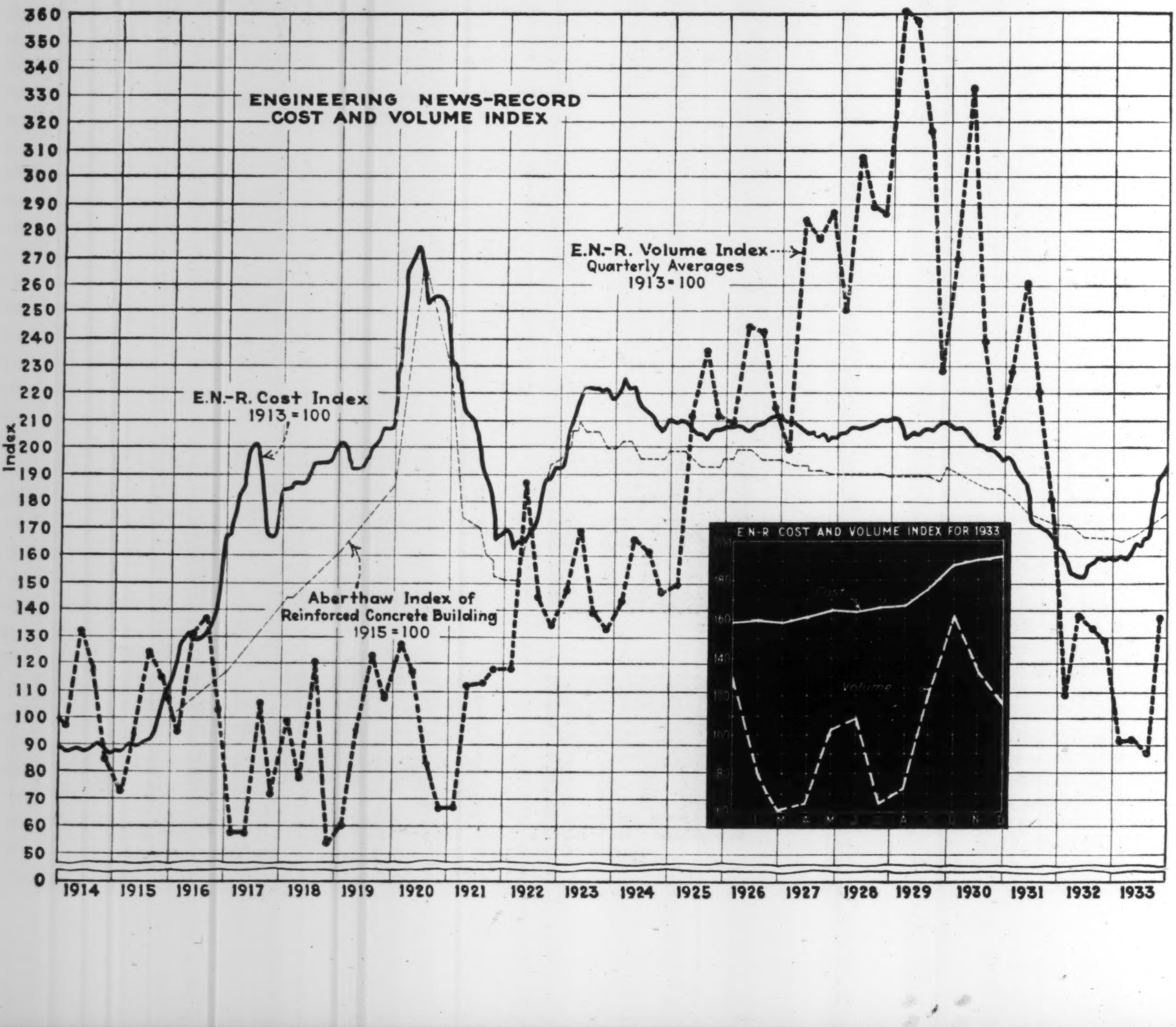


TABLE V — OUTPUT OF VARIOUS CONSTRUCTION MATERIALS FOR TEN-YEAR PERIOD

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1933 to 1932 Per Cent
Lumber production, millions bd.-ft.	35,931	38,339	36,936	34,532	34,142	36,886	26,051	16,523	10,159	13,000*	128
Cement shipments, thous. bbl.	145,753	156,720	161,784	170,928	175,452	169,440	159,558	126,465	80,529	64,086	79
Steel-ingot production, thous. tons	36,811	44,141	46,936	43,777	50,325	54,850	39,595	25,193	13,323	22,879	172
Fabricated structural-steel shipments, thous. tons	2,657	2,998	3,218	2,854	3,122	3,307	2,987	1,812	942	833*	88
Fabricated steel plate, new orders, thous. tons	362	389	516	500	628	639	569	303	162	198*	122
Explosives, new orders, thous. lb.	461,160	481,152	513,876	477,324	455,184	484,596	424,920	325,440	227,508	248,048*	109
Sand lime brick, shipments, thous.	.....	.....	.....	205,080	205,320	172,644	102,552	64,500	27,003	12,627*	47
Face brick, aver. per plant, thous. shipments	13,248	13,284	13,512	13,200	12,948	11,964	8,496	5,388	2,303	1,957*	85
Prepared roofing, shipments, thous. squares	.....	.....	.....	.....	36,540	39,864	27,876	22,592	22,208	23,953*	108

***Preliminary figures.**

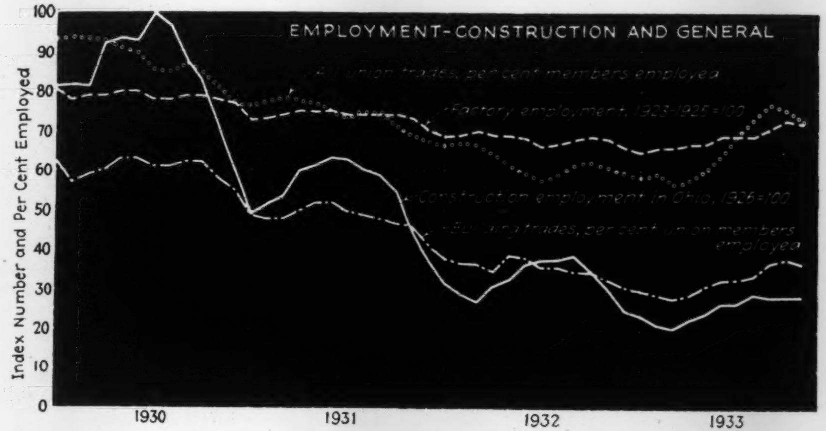


FIG. 8—CONSTRUCTION employment, although it pulled out of the early 1933 slump, still remains far below that of general industry.

Wage rates increased starting about midyear, but because of shorter weeks the income per worker probably changed but little. The *ENR* compilation of skilled construction labor rates, based on the average of carpenters, bricklayers and ironworkers in twenty cities, showed an increase from $0.989 per hour in January to $1.062 in December (Fig. 6). In the same period skilled factory wages rose from 52c. to 60c. The *ENR* compilation of common construction wages, based on the average paid in twenty cities, rose 25 per cent during the year from 42.71c. to 52.02c. Unskilled manufacturing scales rose from 36c. to 45c.

Production of materials

Production of various materials of construction in 1933 showed differing trends. Cement output fell off to 64,086,000 bbl., 79 per cent of the previous year's output. Lumber production increased 28 per cent, the first increase since 1925. Explosives also showed a gain for the year, new orders for 248,048,000 lb. being 9 per cent greater than 1932 orders. Clay products showed a considerable loss in volume of production, while prepared roofing was on the upturn. Though the production of steel ingots rose to 22,878,571 tons, an increase of 72 per cent over the previous year, shipments of fabricated structural steel (833,372 tons) were only 88 per cent of the 1932 volume. The ten-year trend of output of various construction materials is reflected in Table V. Price trends are shown in Fig. 9.

Lumber made the greatest price recovery of the three basic commodities.

Construction to gain in '34

Activity in 1934 depends largely upon action taken by Congress regarding public works, highway appropriations and the Home Loan Act. Unless additional funds are made available by the federal government, highway building will be about the same as for 1933. Nearly half of the $400,000,000 highway fund supplied by the Recovery Act remains to be placed under contract. Increased diversion of gasoline taxes and cessation of local road-bond issues will cut into the highway program. State and municipal construction will be financed mostly by PWA loans and grants, with some additional money expected from bond issues. The federal construction program will probably be greater than last year. Private construction will consist mainly of industrial, utility, railroad and residential work, with little commercial building activity expected. There is a large housing shortage according to some reports, and industrial building is imminent with a continuation of the current upturn in business.

Based on a continuation of the current rate of construction throughout the year, and from probable money available, a fair estimate of the total of all construction for 1934 is $3,200,000,000, an increase of 33 per cent over 1933 and a slight increase over 1932.

FIG. 10—HIGHWAY EMPLOYMENT figures compiled by the U. S. Bureau of Public Roads show the seasonal trend of road work, though federal financing late last year carried the employment total to a three-year high. Maintenance employment is steadily increasing without much seasonal variation.

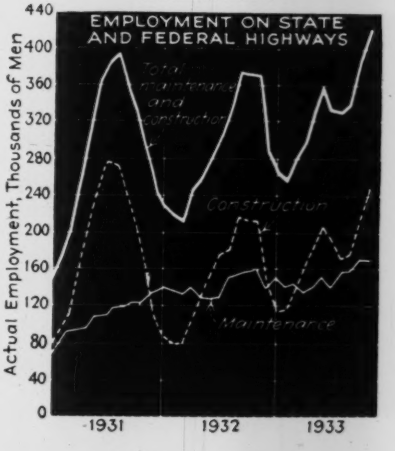
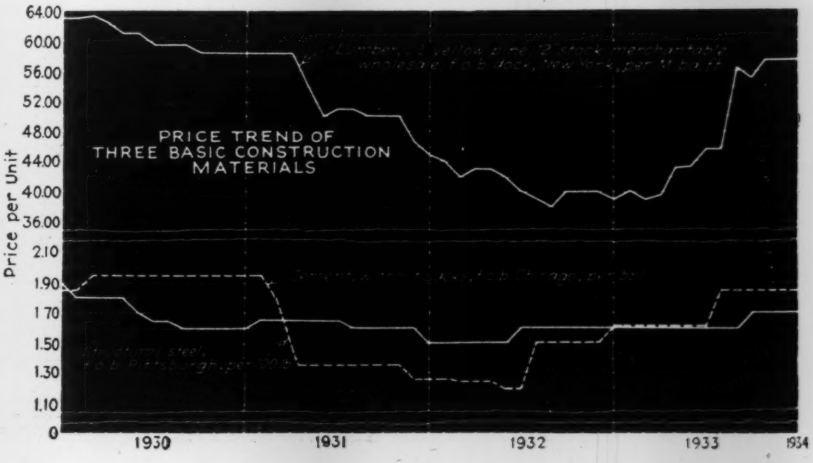


FIG. 9—EACH of the three basic construction commodities registered gains in prices last year, with cement and lumber prices returning to early 1931 levels and steel prices rising to the highest in nearly three years.



Business and Finance in the Economic Revolution

A rapid outline sketch of the leading conditions and events of an unparalleled year in the world's economic history, and their relation to the course of industry and business

BERNHARD OSTROLENK
Economist, The Business Week

EXTRAORDINARY difficulties confront the economic historian who attempts to tell the story of 1933. At best, it is difficult to segregate a given period, especially one so short and so crowded as this one. A mere recital of the kaleidoscopic events of the year would be meaningless unless it placed them in perspective with each other and with the panoramic background of economic growth—for the economic history of any epoch is a growth, a continuous affair, not a phenomenon that can be explained by the events of one year.

In brief, there must be background and meaning.

The background against which 1933 is thrown has been discussed to the point of being worn threadbare. The year opened with a pall overhanging the financial, industrial and agricultural community. For three years the depression had wrought its havoc. Out in the agrarian sections there had been open revolt; in the industrial centers unemployed workers, variously estimated at from 15,000,000 to 18,000,000 were eating into the social fabric. Though the indexes of business activity had been rising since the middle of 1932 (see the *Business Week* Index in Fig. 1) the financial sky was closing in most threateningly, and in the early weeks of the year a fright, a sense of impending disaster, hung over the financial community.

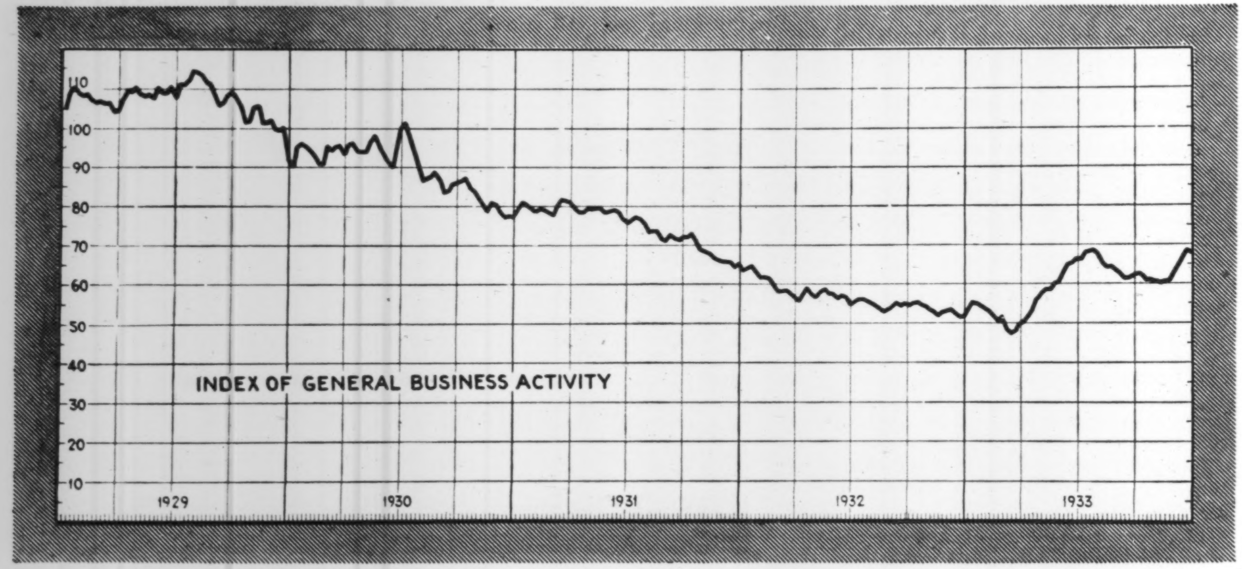
Rumors of new crashes had become commonplace in Wall Street, but this time the incredible was to come true. By mid-February the breakdown of finance was in full progress. Beginning with Michigan, where the impending failure of a large banking chain caused the governor to declare a bank moratorium, various states in rapid succession closed their banking and financial institutions. The prairie fire culminated in the dramatic closing of the banks in New York state on the morning of March 4, which in turn made inevitable the closing of all domestic financial institutions, including the stock and commodity exchanges, and the closing of banks and exchanges in virtually all the capitals of the world, from London, Paris and Berlin to Tokyo and Shanghai.

It was under these conditions of a great crisis that President Roosevelt took the oath of office on March 4.

Action centers at Washington

Problems of prodigious magnitude confronted the incoming administration. Reopening the banks, rehabilitating agriculture, checking the destructive process of deflation, reviving industrial activity, caring for some 18,000,000 unemployed, re-establishing foreign trade, checking bankruptcies, and dealing with monetary

FIG. 1—BUSINESS WEEK INDEX of general business activity, which shows the level of physical volume of business as compared with the season and the year. Normal, represented by 100, is what the current volume should be if the usual seasonal changes and year-to-year growth had occurred.



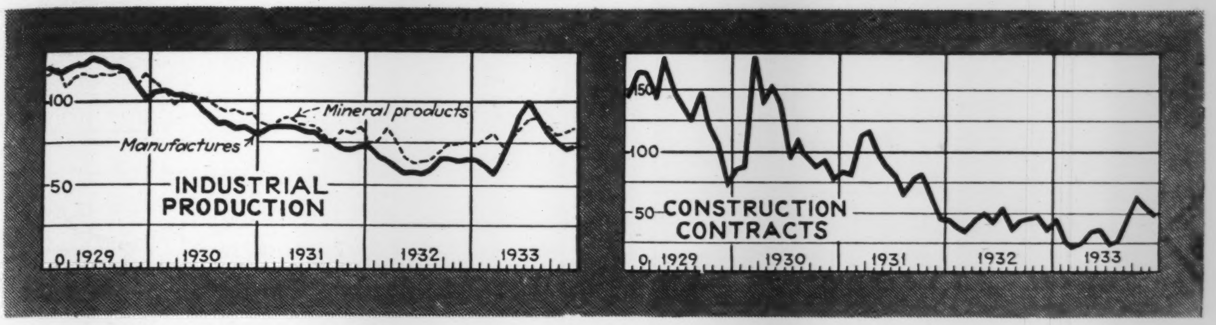


FIG. 2 (LEFT)—INDEX OF INDUSTRIAL PRODUCTION, adjusted for seasonal variation. Monthly average for 1923-1925 = 100. (Federal Reserve Board.) (Right)—Index of value of engineering construction contracts awarded as reported to *Engineering News-Record*. Monthly average for 1923-1925 = 100.

problems, all pressed for immediate attention.

Beginning at this point, the quest for a new underlying economic theory is essential to any connected understanding of events.

Ordinarily we look for the development of new economic tendencies in the activities of the people, and these activities are then transmitted to new financial institutions and newly developing political policies. In truth, it not infrequently happens that these institutions and political policies lag behind the wealth-producing activities of the people. For example, the shift from an agricultural to an industrial nation left political leaders still agrarian-minded; the growth of corporations took place in spite of the anti-trust laws; our unit banking system remained hopelessly inadequate to serve the credit needs of an expanding and dynamic industrial society. And so the list could be extended to show that the intricate activities of a people tend to outrun established institutions, that from time to time these institutions need to be modified radically to serve the new economic environment. For this reason it usually happens that a review of legislation dealing with economic institutions is inadequate to portray the economic tendencies of the times.

But for 1933 we must turn primarily to Washington and not to Wall Street to gain an idea of new financial, social, economic and industrial tendencies. Not the agricultural empire of the Northwest, but Washington, becomes the great farm capital. So also in banking, in industry, commerce, transportation and international trade — Washington for the year took leadership in every field of national or private interest. Plans, programs and legislation originating at Washington during 1933 affected the economic life of the American people to an unprecedented and astounding degree.

By many people the new economic trends are explained in terms of war. President Roosevelt himself speaks of his recovery programs as *a war on the depression,* and the Supreme Court has justified apparently unconstitutional legislation on the ground that it arose out of an unprecedented emergency.

In other quarters the monetary policies of the President are described as a basic conflict between creditor and debtor groups. Holders of some $40,000,000,000 of riskless bonds, whose interest coupons during the deflationary process have been drawing the largest purchasing power in history, are arrayed against the group of debtors who must pay more in goods for their obligations than they expected to do when they contracted the debts. On the plea of "sound money," creditors oppose the President's policies of raising commodity prices to the 1926 level, and argue that recovery must be brought about by the orthodox process of deflating to the bitter end. Aligned with this group are many economists who have no ax to grind, who are sympathetic with the ends which the President hopes to achieve, but who fear the consequences of a monetary policy that has always, they claim, led to uncontrolled inflation and disaster. Debtor groups argue quite as insistently that the deflationary process is a form of robbery, that it forces debtors to pay in goods an unbearable amount, and that this fact is leading the country into a continuous chain of bankruptcies, unemployment and incalculable disaster.

Then there are those who see in the trend of events the culmination of an irrepressible conflict between agrarian and industrialist interests; and those who regard the NRA code system as a piece of the strategy incidental to a final battle between centralized capital and organized labor. There have even been hints that current events should be interpreted as a conflict between producers and consumers!

It is by no means certain that the conflicting elements of 1933's economic history can be so neatly sorted and pigeonholed as these explanations would imply. And, on the other side of the case there are interpreters who see in the year 1933 not conflict but the culmination of a social and economic integration, of a fusion of common interests, that has been going on under our democratic form of government for many years. These individuals look upon recent events as signs of the growth of a nationalism that aims to consolidate the economic interests of the country.

Without attempting to appraise these explanations of tendencies, we set them down as a significant item in the economic thinking of 1933. It seems to be agreed by all groups that we are destined to enter a new economic environment, radically different from the one that dominated our wealth-producing activities before the depression. Realists need to ponder this intangible item.

A chronicle of memorable events

We turn to Washington to get a picture of the economic events of 1933. The closing of the banks, their reopening under strict government control, the gold embargo (which meant that we abandoned the gold standard), the National Industrial Recovery Act, the act creating the Agricultural Administration with the Thomas amendment that gave the President inflationary powers new in the history of the United States, the Securities Act, the creation of the Public Works Administration, and the setting up of a staggering list of alphabetical bureaus by the government, were wholly outside the experience of the average business man. He was utterly at a loss to appraise the effects of these measures on business activity.

Let us briefly review the sequence of events, so that the reader may attempt to trace their influence upon the adjoined curves of business statistics.

The changed economic philosophy was soon expressed in constructive action. The Administration, in part by administrative fiat and in part by pressure on Congress, put into immediate effect a mixture of recovery, rehabilitation and reform programs. The coming of beer ended the era of sumptuary repression. In April appeared the first significant shift in administrative thinking when the Civilian Conservation Corps was or-

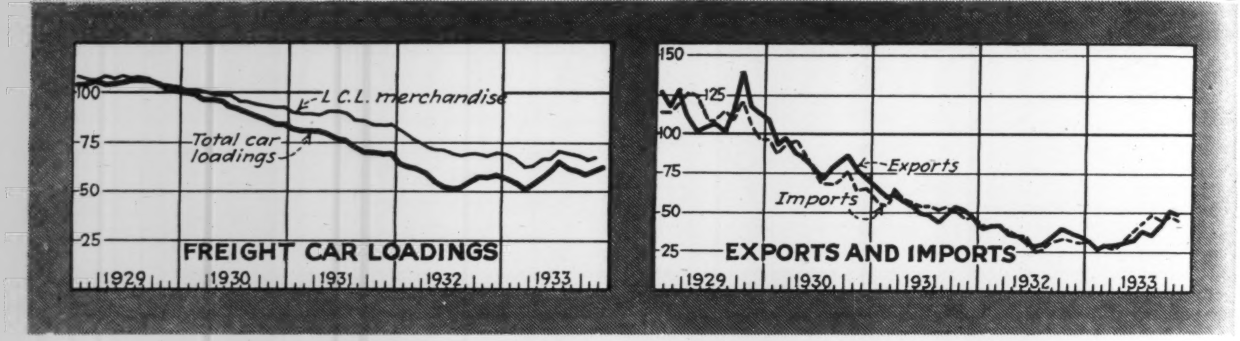


FIG. 3 (LEFT)—INDEX OF FREIGHT-CAR LOADINGS, adjusted for seasonal variation. Monthly average for 1923-1925 = 100. (Federal Reserve Board.) (Right)—Index of value of foreign trade. Monthly average for 1923-1925 = 100. (U. S. Dept. of Commerce.)

ganized to employ 300,000 men from 18 to 25 years old whose families were on relief. Funds were made available from the regular budget through economies in the reorganization of departments, cutting government payrolls and reducing veteran relief. In June a $3,300,000,000 public-works program was passed. For years there had been desultory talk of a public-works program as an item in recovery. This step, now taken, in many quarters was looked on as the most important step for recovery. Of the total amount, $400,000,000 went to states for roadbuilding, $238,000,000 for naval construction, $50,000,000 to the Tennessee Valley Authority, and many hundreds of millions to other federal projects. In its ultimate application some $800,000,000 went to non-federal projects, including $200,000,000 for the railroads.

The appropriation was expected to place immediately several million workers on jobs but because it was slow in getting under way the Civil Works Administration was organized in November to give immediate employment at regular wages to 4,000,000 men and women, partly from relief rolls and partly from federal employment bureau lists, on useful improvements of minor character.

Intermingled with these recovery projects, there appeared efforts of the Administration to reform economic processes. For the first time there emerged a definite federal policy toward the utilities. The office of Coordinator of Transportation was created to eliminate unnecessary duplication of railroad services and to facilitate and permit joint use of terminals, to prevent impairment of earnings, and to avoid other expenses. A long-term program of soil conservation was announced. The Federal Emergency Housing Corp. was chartered with $100,000,000 of Public Works Administration funds to engage in the construction of low-cost housing and slum-clearing projects. The Federal Subsistence Homestead Corp. was organized with $25,000,000 to rehabilitate stranded industrial workers, marginal farmers, over-age employees and seasonal workers, who are to derive a livelihood by tilling small tracts surrounding their homes. Direct relief was distributed through the Federal Emergency Relief Administration, with $500,000,000 to be supplemented by state funds. The Surplus Relief Corp., another new body, used funds of the Emergency Relief to buy surplus farm products from the Agricultural Adjustment Administration and to distribute food to the unemployed.

Then there were created in rapid succession large and novel banking institutions to prevent the loss of farms and homes through foreclosures and the loss of bank deposits through bank suspensions. The Farm Credit Administration greatly expanded the work of the Federal Land Banks, made available funds for the exchange of farm mortgages for lower-interest land-bank mortgages, provided loans for second mortgages, expanded the Intermediate Credit Banks by supplementing them with a Commodity Credit Corp. to provide crop-reduction loans, and created a Regional Bank for cooperatives in each of the twelve Reserve districts.

Activities of the Federal Home Loan Banks were energized, and the Home Owners' Loan Corp. was created to give to urban home-owners the same mortgage-exchange opportunities as were given the farmers. The Federal Deposit Insurance Corp. was chartered under the Glass-Steagall Act in June for the protection of bank deposits. The temporary measure insures accounts up to $2,500 and is to be replaced in July, 1934, by a permanent fund, when deposits up to $10,000 will be insured and larger deposits at a decreasing percentage. The Reconstruction Finance Corp. was expanded to aid in the reorganization of banks and trust companies by purchasing preferred stock in capital notes and debentures.

It is difficult here as in other legislation, to distinguish recovery activities from reform. They intertwine.

Money and commodity prices

The varied governmental activities have been discussed here only fragmentarily. Some further attention is required by the monetary developments, in view of their outstanding importance.

From the very beginning the President had given the country to understand that he desired to create the 1926 price level, in order to give the dollar the same debt-paying power it had seven years ago. Moreover, he indicated that we would move toward a managed currency. After the abandonment of the gold standard on April 19, the dollar depreciated in all foreign currencies, with wide fluctuations on its way down. The World Economic Conference in June went to pieces because President Roosevelt was not yet ready to stabilize the dollar in relation to foreign currencies.

By July 18 the pound sterling had risen to $4.84—from $3.47 four months previously. On that date the first retaliatory measure was taken by the British Treasury, when it announced its offer to convert the 20-year, 5½-per cent United Kingdom dollar gold bonds into sterling 2½-per cent bonds at a rate of conversion equal to about $3.85 per pound sterling. The offer to enlarge the supply of sterling on the market caused sterling exchange immediately to fall to about $4.48, bringing with it a corresponding rise in the dollar. Subsequently the dollar remained reasonably steady, during which period the Treasury on August 15 floated $1,189,000,000 of new securities, of which $825,000,000 was in long-term bonds. After this there were successively announced the plan of purchasing domestic, newly mined gold at a value far above the statutory price of $20.67 per ounce, and the plan of buying gold abroad at a figure which started at $31.36 an ounce and ultimately rose to $34.45 by January of 1934. The latter figure put the theoretical gold content of the dollar down to 60 per cent of its gold-standard value. At the time of the inauguration of the President the pound sterling was selling for $3.47; at the end of December it had risen to $5.16. The franc by that time had risen from 3.96 to

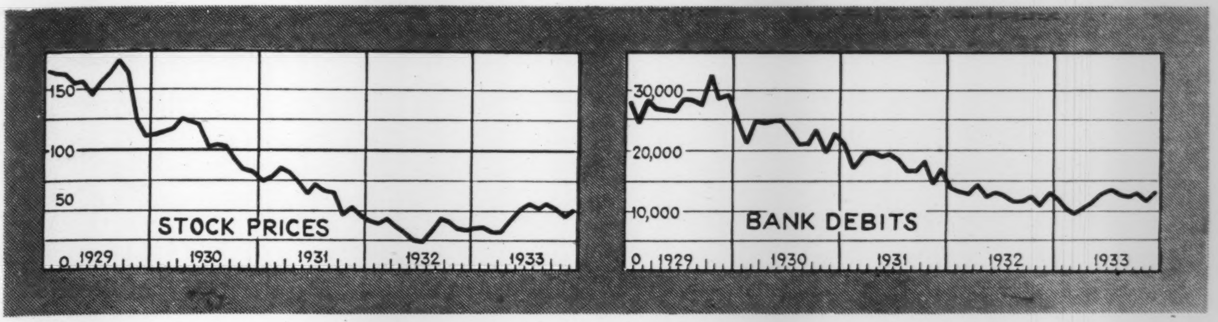


FIG. 4 (LEFT)—STOCK-PRICE INDEX, based on average price corrected for split-ups, etc., Jan. 1, 1925 = 100. (New York Stock Exchange Bulletin.) (Right)—Bank debits outside New York City, in millions of dollars, representing for the most part checks against depostors' accounts. (Federal Reserve Board.)

6.71c.; the reichsmark had risen from 24 to 41c.

Unfortunately, an authoritative explanation of how the depreciation of the dollar in terms of gold is related to the President's desire to re-establish industrial activity through a rise of commodity prices cannot be given, as no important official of the government has attempted to inform the country on this relationship. But we may turn to the writings of Prof. George F. Warren of Cornell, who is reported to be the financial genius and adviser of the Roosevelt policies. Professor Warren's theories are embodied in a book called "Prices," by Warren and Pearson.

In brief, the authors of this voluminous and highly statistical study come to the conclusion that the fixed price of gold continually disturbs values. Though the price of gold at $20.67 an ounce remains constant, the purchasing power of gold in terms of goods varies widely. Therefore, Warren and Pearson conclude that by varying the price of gold its purchasing power may be kept constant. In other words, by so varying the amount of gold in the dollar that the dollar can maintain the same purchasing and debt-paying power, the price level (not the price of any one commodity) will be held constant.

The method of the Administration to accomplish this effect was to devalue the dollar on foreign exchanges by using foreign credits of Americans to purchase gold abroad at an increasing price. By this method the gold price was advanced to $34.45 by the end of the year, as against the statutory price of $20.67.

This bare recital of monetary developments does not permit of enlarging on their significant repercussions in the industrial and financial field. Some of the major facts may be read out of the accompanying charts of prices and business activity. In addition, it is to be noted that a storm of protest accompanied all phases and stages of these monetary changes and that the wildest and most diverse implications were read into each step. Occasionally, too, the significance of the happenings was drowned out by the bass drums of other and seemingly more important developments, such as the passage of the National Industrial Recovery Act, followed by the making of codes, the interpretation of the labor clauses of the new act, and the work of bringing the country under the Blue Eagle symbol of countrywide acceptance of the President's Re-employment Agreement, a temporary device designed to shorten working hours and raise wage-purchasing power before industry codes could be completed.

Speculative buying and farm rehabilitation

Two separate groups of events of the year are also of profound economic importance. First of these is the mad speculative activity of finance and the rush of production in the spring and summer of 1933 to beat inflation and prospectively higher NRA costs. This rush sent prices of securities and commodities to levels that they had not reached since the middle of 1931, and the rise was accompanied by an increase in business activity of 50 per cent over the March level. Subsequently there came a sharp decline, when purchasing power was unable to absorb the stocks hastily accumulated in the pre-NRA weeks. Nevertheless, due to this rush and to the codes, by the end of the year it was estimated that employment had been increased by more than 4,000,000 workers.

The second important event is the farm rehabilitation plan, centering in the activities of the Agricultural Adjustment Administration. In the middle of the summer the mules of the cotton fields had to unlearn their ancient art of not injuring the cotton plants when cultivating the field, and instead had to walk on every third row, so that a third of the crop might be plowed up. In the fall wheat farmers were being paid to reduce their winter wheat acreage, and contracts were being signed by tobacco producers to reduce their tobacco acreage in 1934. Five million sows and pigs were killed in order to increase prices. Milkshed agreements were being made in cities all over the United States to fix milk prices to farmers, and in some cases to consumers.

A vast program of farm price increase was thus put under way, in which the farmer was being paid by the government to reduce production, and revenue for this payment was being raised by a complicated system of processing taxes on the commodities directly affected as well as by compensating taxes on commodities indirectly affected. Cotton acreage was reduced by one-third; yet production was only slightly affected, because the weather was so favorable that what the crop lost in acreage it made up in yield per acre. Similarly, in place of the sought-for 15 per cent acreage reduction in winter wheat the total reduction is now estimated at less than 7 per cent because of increased plantings in the central and eastern states by farmers who did not sign reduction contracts. Marketing agreements in tobacco have already substantially increased prices for this crop, but hog prices have as yet remained unaffected by the vast birth-control program that was undertaken.

The net effect of the agricultural program is increased farm purchasing power, which is plainly visible in the huge increase in sales of automobiles in the agricultural regions. Between benefit payments of the government and higher prices for agricultural commodities—which by and large went up faster than some of the commodities that the farmer had to buy—it is now estimated that farm purchasing power will be increased by about 2.5 billions of dollars. The two leading mail-order houses increased their sales to farmers by 3.7 per cent for the year. New car registrations during the fall months were from 100 to 300 per cent higher in southern and midwestern agricultural states than during the corresponding period the year before.

A 32-billion-dollar national debt by

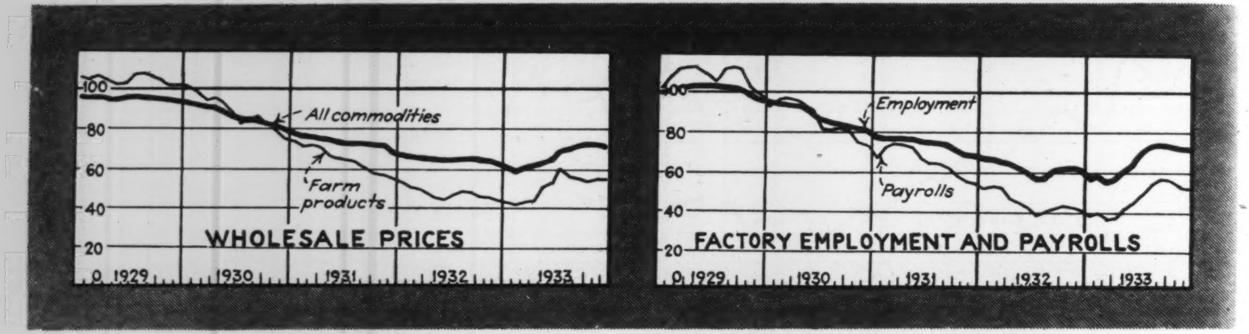


FIG. 5 (LEFT)—INDEX OF WHOLESALE PRICES, comprising prices of 784 commodities. Monthly average for 1926 = 100. (U. S. Dept. of Labor.) (Right)—Indexes of industrial employment. Employment figures adjusted for seasonal variation; payroll figures unadjusted. Monthly average for 1923-1925 = 100. (Federal Reserve Board.)

1933 against a 16-billion debt in 1929 represents the cost of the depression to the Treasury. But as against this alarming piece of evidence, our outlook must take into account a number of much more vital factors. To list first the favorable ones:

1. Fear of a further banking crisis with its concomitant uncertainty has disappeared. Bank suspensions are no longer front-page news. And this is a tremendously important fact.

2. Monetary uncertainty also is playing a less important part, since the President recently defined the future stabilization price of the dollar as lying somewhere between 50 and 60 per cent of its former value. This should have the effect of stimulating foreign trade and should permit the business man to make long-term contracts and to forecast with some degree of certainty the trend of prices.

From March to the end of the year the price of gold increased 56 per cent, prices of basic (international) commodities advanced 36 per cent, wholesale commodity prices rose about 18 per cent, and retail prices advanced 15½ per cent. Prices of some international products such as wheat, cotton, tobacco, lard, copper, tin, rubber, silk, etc., rose almost in exact proportion as the dollar fell, in the early part of the year even outstripping the dollar decline. Domestic commodities were affected more slowly, and some commodities that are traded only locally such as milk, remain so far unaffected by dollar depreciation.

On the whole we may now expect to see the effects of dollar depreciation widened among large groups of domestic commodities. For example, the increase in the price of cotton to well over 11c. has already affected cotton costs and ultimately will affect garments and the like. The same thing holds for other commodities. Price rises may not be spectacular but probably will be reasonably steady.

We may expect during 1934 greatly increased purchasing power. The first efforts of the Administration greatly stimulated the manufacture of consumption goods; but this field is wholly inadequate to re-employ the large group of unemployed workers or to stimulate purchasing power to the point where business activity can continue on its own momentum. An increasing amount of pressure is now being exerted on business by stimulating the production of durable goods through a vast public-works program. Very little of this has as yet come into action, but the major portion is expected to make itself felt in industry within the first half of the current year.

3. Finally, the sympathetic effects of the very sharp revival of industrial activity in many European countries must not be overlooked; in Norway, Sweden, the United Kingdom, Japan and scores of other countries, important industrial indices have turned up. The recognition of Russia in December also has some economic significance. Already our foreign trade has begun to feel the beneficent effects of greatly increased exports, and the outlook in this field is more encouraging than it has been for several years.

On the reverse side, business men must take note of certain negative, if not unfavorable, factors.

1. Nothing has yet been done to remove the tariff barriers, important factors in bringing about the economic debacle. The great problems of re-establishment of purchasing power of the farm population is only partly solved by the crop limitation program. The more scientific course, advocated by Secretary Wallace, is the purchase of submarginal land by the government (rather than reduction of acreage of all classes of crop lands) and the re-establishment of our foreign markets.

There is no doubt that such foreign markets could be found if we would permit other nations to effect payment by selling us goods. A scientific approach would be to reduce and adjust the tariff so as to permit the inflow of between two and three billions of dollars of goods, which would simultaneously give us an equivalent export market for agricultural and other domestic commodities.

2. Another negative factor is the absence of any signs of a revival of long-term financing. Whether because of the Securities Act or the general financial condition of the country, no new financing of any significance outside governmental circles has gone on. It is possible that for some time to come it may be necessary to finance long-term production via a great government holding corporation such as the RFC, thus shifting the investment-banking capital from Wall Street to Washington—possibly temporarily and possibly permanently.

3. Another negative factor is the absence of revival of commercial credit. At the present time to a very astonishing degree our banks are being loaded with United States government obligations, and no short-term, self-liquidating, commercial credit is being developed in the sense for which commercial banks are supposed to function. The loading of our banks with long-term bonds has the effect of unbalancing the production of producers and consumers goods.

* * *

On the whole, the 1934 outlook for the first six months is for a rather steady increase in business activity, accompanied by slowly rising prices, increased purchasing power, a probable advance in securities (especially stocks and second-grade bonds) a decrease of unemployment and further stabilization of foreign trade. The forecast made by the highest economic authority in the land, the President himself, is as follows: "It is evident to me, as I am sure it is evident to you, that powerful forces for recovery exist. It is by laying a foundation of confidence in the present and faith in the future that the upturn which we have so far seen will become cumulative. . . . We can confidently look forward to cumulative beneficial forces represented by increased volume of business, more general profit, greater employment, a diminution of relief expenditures, larger governmental receipts and repayments, and greater human happiness."

Public Works and the PWA

Reviewing and appraising the unprecedented effort to end a depression by public construction and some thoughts on future plans and policies

BY DAVID CUSHMAN COYLE

Consulting Engineer, New York, N. Y.

FROM among the multitude of new events and policies of 1933, the public-works policy stands out in many respects as the most decisive. By undertaking a large program of depression construction, the government, or more truly the nation, recognized the long-denied responsibility for counteracting mass idleness, and at the same time took practical account of the dependence of mass production on mass purchasing power and consumption. Through this program it planned to put millions of men to work before the end of the year, building the widely distributed public improvements that local governments no longer could carry out. It was a tragedy of political management that only a small part of this plan was realized. The civil-works system of work relief had to be resorted to as a winter expedient. Nevertheless, a national public-works system for employment equalization appears to have come to stay.

● Reviewing this dramatic development, David Cushman Coyle looks at it from the vantage point of close contact with the subject. Long a student of engineering economic questions while following the profession of structural engineering, he took active part in the efforts of the past two and a half years to bring about the enactment of a public-works bill. After the PWA was set up, he served as a volunteer in the housing division and later was named a member of the technical board of review. His present outline of the movement, however, reflects his personal views alone, and is in no sense official.

—Editor.

THE USE OF public works as a remedy for unemployment in depression has been widely discussed since the war. Senator Kenyon, of Iowa, introduced a bill in 1921 providing for a Prosperity Reserve to be used in hard times for public works. Early advocates of timing public-works construction to balance the swings of business included Edward E. Hunt and Otto Mallory, and it was supported by the American Engineering Council, of which Herbert Hoover was president. In 1930 the Wagner Bill, based on the public-works idea and providing for the Federal Employment Stabilization Board, was passed, and the board was organized with Col. Donald H. Sawyer as director.

When the depression became severe, strong efforts were made to obtain a federal public-works program. Senators La Follette, Wagner and Costigan fought valiantly for federal public works, and the American Society of Civil Engineers appointed a committee under John P. Hogan which did yeoman service. The Emergency Relief and Construction Act of July 21, 1932, provided for loans by the Reconstruction Finance Corporation (established by Congress a few months earlier) to certain types of private corporations and for a small amount of federal work, but owing to the restrictions under which the RFC was forced to act no appreciable results were obtained.

Objections to a public-works program

Throughout the first three years of the depression, prevailing sentiment was unfavorable to a public-works program for re-employment. Many people were definitely hostile to it on sincere conviction; the majority were apathetic, or looked with suspicion on the suggestion that we could recover by spending money. The Coolidge admonitions to thrift and the famous Hoover dictum that "We cannot squander ourselves into prosperity" had many followers.

The fundamental objection lay in the fact that such a program was inconsistent with the economic theory and practice under which business had traditionally been carried on, a theory that required a wholesale scaling-down of values before normal recovery could be expected. This scaling-down was in progress, and a program of timed public works obviously did not fit into the—accepted—economic scheme. During the period of deflation a public-works program seemed likely only to retard the deflationary process and postpone the day of revival. On the other hand, however, there was a pressing need for unemployment relief, and the need could not be wholly denied. The solution of the dilemma lay in "local self-help"—that is, in the assumption by the municipalities of the duty of providing relief and work relief. This brilliant phrase of self-help not only saved the deflationary theory, but also threw the ultimate tax burden on the local taxpayer and protected the larger incomes from the danger of heavy federal taxation.

By 1932, however, the deflationary process had become painful even to the financial group, a new phenomenon that was wholly unexpected, being out of accord with all preceding depression experience (based, as it was, on depressions of shortage rather than of plenty). The federal government, therefore, was called upon to resist further deflation, and the RFC was set up early in the year to inject inflated credit into the capital structure; the Federal Reserve cooperated by open-market operations. In the summer of 1932 the inflation started in the commodity and security markets, but it failed to hold through the fall. Such was the situation when the new administration came into office.

The adventures of the past ten years had left the American people in a state of considerable confusion. Parts of the deflationary theory of the earlier years still persisted, side by side with inflationary ideas more suitable to a period of business upturn. Budget balancing, a deflationary measure, was still considered essential. Inflation was said to be wicked and suicidal, while long-term investment, the backbone of stock-market inflation, was looked upon as financially "sound." Public works were denounced as creators of debt, while the modernization of industry, though also a creator of debt, was urged as the way to recovery.

Public-works principle adopted

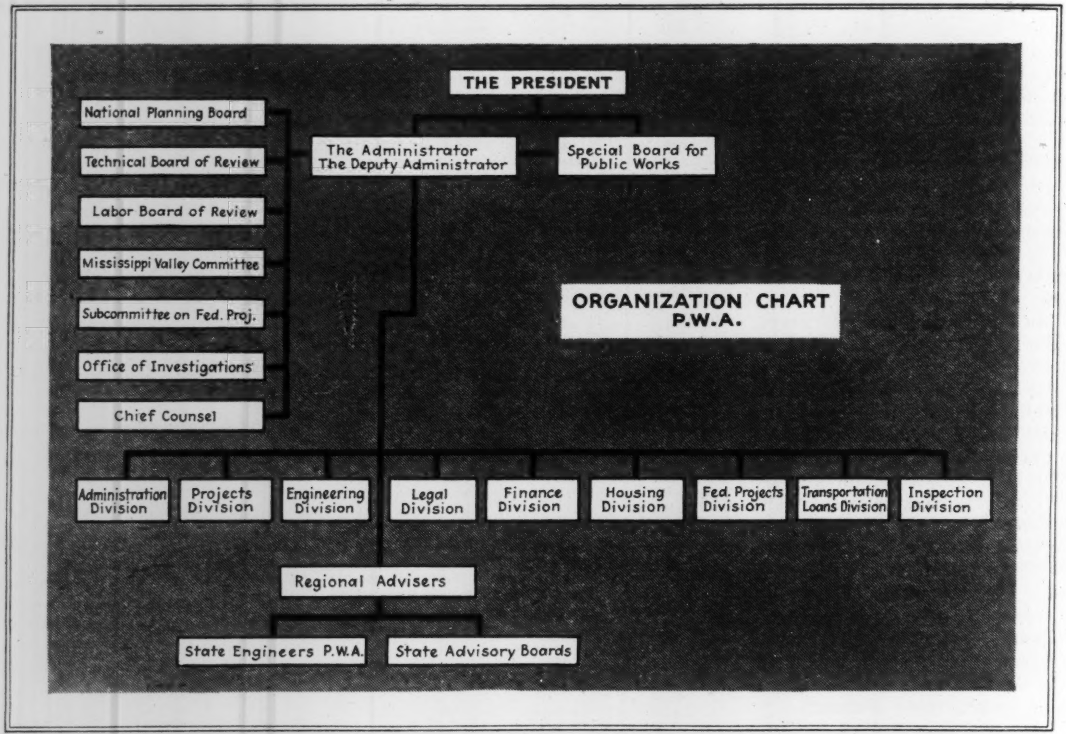
But in the increasingly hard and utterly disillusioning experiences of 1932 and the early part of 1933 the ancient dogmas more and more lost currency. By the time the new government which the dissatisfied country voted into office by overwhelming majorities took over the helm, the conviction that a great public-works program was imperative had gained a substantial foothold. President Roosevelt's support finally turned the scale.

First, however, the President established the Civilian Conservation Corps as a means for putting to work 250,000 idle youths with dependents, on a bare subsistence wage. The economic effect of this measure, slight in any event, was wholly neutralized by the fact that on account of the demand for government economy it was thought necessary to finance the CCC at the start by using funds earmarked for public works.

Less than two months later Mr. Roosevelt declared for a public-works program, and after much difficulty in Congress it was passed by the middle of June. It appropriated a fund of $3,300,000,000 for public works both federal and local, certain of these works being specified (as, $400,000,000 for highways); and for some private projects. Local public works might be granted a 30 per cent free grant, the rest to be a secured loan; private projects could obtain loans only. Flood-control and a few other works might obtain a 100 per cent grant.

As passed the act was profoundly affected by certain other aims of economic reconstruction and by the necessity of reconciling it with the apparent demands of the public. But at all events the public-works principle had won national acceptance.

A prime complication was the inclusion of an industrial recovery law in the act (Title I) authorizing industry groups to draft codes of fair competition containing wage and hour limitations, permitting collective bargaining of workers and prohibiting unfair trade practices. While this part of the act did not inherently interfere with the public-works part (Title II), it did in fact retard the operation of the latter because the government directed its first effort to applying Title I, possibly in the belief that correction of industrial abuses might by itself lead to business revival. If there was such a belief, it was disappointed. But at all events the effectuation of Title II was seriously delayed, first by discarding a ready organization that had been set up in advance, and second by virtually suspending Title II for three weeks, placing it under a temporary administrator meanwhile.


THE PRESIDENT
National Planning Board
Technical Board of Review
Labor Board of Review
Mississippi Valley Committee
Subcommittee on Fed. Proj.
Office of Investigations
Chief Counsel
The Administrator
The Deputy Administrator
Special Board for Public Works
ORGANIZATION CHART
P.W.A.
Administration Division
Projects Division
Engineering Division
Legal Division
Finance Division
Housing Division
Fed. Projects Division
Transportation Loans Division
Inspection Division
Regional Advisers
State Engineers P.W.A.
State Advisory Boards

One of the hampering features of Title II was that the economy program had crippled the federal services, and part of the appropriation had to be used to replace department funds cut off by Congress. A more serious difficulty arose from the existence of powerful influences that were hoping for a stock-market inflation (called a "revival of investment"). They argued strongly in the summer of 1933 that the government should withdraw and allow the balloon to rise by itself. With the ending of the summer's stock-market rise, however, this argument became less effective, and by late summer the public-works organization was able to proceed with some hope of ultimate public support. A renewed demand for abandonment of federal action and resort to stock-market inflation has arisen since the beginning of 1934, and constitutes one of the present dangers of stable recovery.

Under the act speedy action was impossible. The highway program, to which $400,000,000 was allotted, was the nearest to a quick-acting project, though even here only a little more than half the 1933-'34 fund is yet under contract. Much of the federal work is large and slow-moving. The local work—other than highways—was required to be done on a loan basis, a relic of "local self-help" by which the relief activities of earlier years were prevented from producing anything but municipal debts. Any city that was not already over its ears in debt was now invited to become so, while any city in desperate condition could get no help. The loans had to be made against valid bond issues, a time-consuming element. Most serious of all was the fact that the appropriation of $3,300,000,000 was so small that the part of it which could feasibly be put into action in one year could not influence noticeably a country as large as the United States.

As a consequence, by November, 1933, the civil-works program had to be adopted as an emergency measure. Whatever the wastes involved in civil works, the fact is that no other escape could be found from the limitations of the PWA.

Under such circumstances, the only result that could be hoped for from Title II of the NIRA was the establishment of a going organization capable of operating a public-works program, and a change in public opinion that would perhaps ultimately favor a really serious attack on the depression through public works. Both these possibilities have been realized. The PWA is prepared to attack the depression whenever adequate funds are provided and whenever the people have learned at least to want public works, if not how to get them.

The first duty of the administration was to ensure that work done under the act should be free from graft. The Secretary of the Interior Harold L. Ickes, was appointed Administrator because he was known to be honest and a determined hater of crooked work. Although the unemployed were in great need of immediate help, yet if serious scandals were to appear there was danger that public opinion might turn against any federal spending program and thus the possibility of a sound recovery would be irrevocably lost. The building of an organization of competent engineers and experts in law and finance was necessarily a slow process that occupied all the summer of 1933. State engineers and state advisory boards were chosen to examine and report on local projects, with regional advisers to assist the National Planning Board in formulating a long-range plan for public works and to coordinate the work of the state organizations so far as might be possible. The act had provided for a National Planning Board, which was appointed with Frederic Delano as chairman and which has initiated studies of national economic conditions and of the relation of public works to the stabilization of industry.

During the summer, while the organization was being built up, the federal projects were rushed forward, and most of the federal allotments were made at that time. This permitted work to be started promptly on these projects in all cases where the necessary plans were available, and as a result nearly all of the employment furnished by the program during 1933 was on this type of work. About 500 applications were also turned over by the R.F.C., covering miscellaneous private and local public work, and these were examined during the first months.

New and proper local projects were slow in appearing; rules and regulations for local work had to be established, after which the labor of preparing plans and dockets took some little time. By early fall, however, the tide of local applications was running strongly into Washington from the state organizations.

ALLOTMENTS, CONTRACTS AWARDED. DAY-LABOR WORK STARTED AND WORKMEN EMPLOYED UNDER THE PUBLIC WORKS PROGRAM

Month	Allotments	Contracts Awarded	Value of Day-Labor Work Started	Contracts Plus Day Labor	Number of Men at Work at End of Month
Total Federal and Non-Federal Projects					
June	$638,000,000	$901,043	....	$901,043	......
July	51,435,068	15,785,934	....	15,785,934	329
August	282,852,051	110,718,600	$82,513,425	193,232,025	9,654
September	397,062,659	56,921,019	32,238,751	89,159,770	75,703
October	200,450,981	148,573,543	19,672,573	168,246,116	185,461
November	282,339,406	163,967,812	18,509,432	182,477,244	247,039
December	344,512,578	103,228,340	29,025,246	132,253,586	250,750
Total	$2,196,652,743	$600,096,291	$181,959,427	$782,055,718*	250,750
Federal Projects					
June	$638,000,000	$901,043	....	$901,043	.....
July	50,555,000	15,785,934	....	15,785,934	329
August	191,496,051	110,718,600	$82,513,425	193,232,025	9,654
September	314,995,658	51,590,508	32,232,720	83,823,228	74,453
October	109,266,013	147,726,822	17,877,112	165,603,934	182,003
November	39,852,665	132,717,003	17,063,065	149,780,068	240,103
December	24,919,958	87,338,276	25,108,476	112,446,752	226,147
Total	$1,369,085,345	$546,778,186	$174,794,798	$721,572,984	......
Non-Federal Projects					
June	....	....	....	....	......
July	$880,068	....	....	....	......
August	91,356,000	....	....	....	......
September	82,067,001	$5,330,511	$6,031	$5,336,542	1,250
October	91,184,968	846,721	1,795,461	2,642,182	3,458
November	242,486,741	31,250,809	1,446,367	32,697,176	6,936
December	319,592,620	15,890,064	3,916,770	19,806,834	24,603
Total	$827,567,398	$53,318,105	$7,164,629	$60,482,734	......

*Latest figure is $1,072,385,430.

Details of administration

A local project is first submitted to the state engineer and state board, who examine it in the light of their knowledge of conditions and transmit it to Washington with their recommendations for or against. There the dockets are distributed to three examining divisions, engineering, legal and financial.

The engineering division is made up of technicians in many branches, so that the project can be examined by a man able to judge of its technical features. At the same time an opinion is given in the case of self-liquidating projects as to whether the prospective income seems to be reasonably sure of realization.

The legal division at the same time examines the question of whether the applicant has power to engage in the proposed work and to issue the necessary bonds. In some states it was found that existing laws made it impossible to conform to the requirements of the act, and steps were taken to get enabling legislation where possible. The time required for examination has depended largely on the amount of correspondence required and on whether special legislation or court decisions had to be obtained.

The financial division looks into the financial standing of the applicant and reports on his probable ability to repay the loan.

Section 203(d) permitted the President to extend the benefits of the act to towns that were unable to borrow, but this clause was of no practical value, since it was obviously impossible to give grants to some towns and force others to issue bonds at the same time.

When a project is approved by all three examining divisions, it goes to the Deputy Administrator, Col. Henry M. Waite, who ordinarily sends it up to the Administrator for recommendation to the special board for public works. This board is composed of members of the President's cabinet, together with Colonel Waite and Assistant Secretary of the Treasury L. W. Robert, Jr., who is in charge of federal building construction. If passed by the board, a project goes to the President for final approval. If rejected, the project is dead.

In case one or more of the examining divisions recommends the rejection of an application, it goes to the technical board of review for further examination and recommendation. The board of review has a permanent chairman and a staff, who look over the application to see whether there can be any question as to its rejection. Most such projects are hopelessly ineligible for one reason or another, and are rejected by the Administrator on the board's recommendation without further hearing. Where a reasonable doubt exists, the board holds public hearings. The members of the board are engineers in private practice who go to Washington from time to time on a *per diem* basis and sit as a court to hear disputed cases. Accepted projects on which there are protests by interested parties also come before the board for hearing and recommendation.

Housing and slum clearance

Housing is in charge of a special housing division made up of architects, engineers and builders, with a legal and financial staff of its own. The intent of the act was that private limited-dividend corporations should be formed by public-spirited citizens, who would acquire suitable land and build low-cost housing for the lower-income groups with the help of federal loans. A few eligible projects were sent in, and in certain cases where the requirements could be met the funds were allotted. However, out of 426 applications, totaling $757,000,000, allocations have been granted to only 20, totaling $48,316,958.

Federal projects

Federal projects are handled in a special department, the federal projects division, which obtained from the various governmental agencies lists of construction work under way or proposed and established priorities among such projects in accordance with the purpose of the act. Work was chosen that appeared to be capable of providing early employment, although in many cases, such as public buildings, the only immediate employment was that of a few architects and engineers.

Irrigation projects were considered on the theory that new land should not be brought into action until the problem of excess farm production has been solved. As a means of helping the farming situation, various federal projects involving purchases of marginal land were approved. Certain states were found to be unable to get any large volume of local public-works allotments, owing to legal or financial difficulties, and a definite effort has been made to allocate federal projects to such states.

Administrative policies

The labor policies of the Administration are directly concerned with the necessity of causing a rise in the wage scale. Minimum wages for skilled workers were set at $1 an hour in the South and $1.20 an hour in the North, with other minima in proportion. The object was not merely to provide a few lucky workers with buying power but to cause a general rise in wages. In the civil works, where action has occurred on a sufficient scale to produce visible effects, the tendency to force a general rise in wages is apparent.

The PWA has adopted a policy in regard to municipal power plants in accordance with the President's campaign announcements in 1932. Where holding companies or other influences have led to high rates for electricity, there has been a tendency for municipalities to attempt to set up competing plants. Seventeen such projects have been approved by the PWA. The total effect in directly destroying the value of existing plants will be small, but the effect in forcing reasonable rates is expected to be considerable, and strenuous opposition is being offered by the industry, both at Washington and in the courts.

Results of program to date

The results obtained to date from the public-works appropriation indicate clearly the relative speed of action of the various types of work coming under the act. By far the largest number of men are of course employed under the CWA, a federal project on a grant basis, using local agencies to carry on work that does not require elaborate planning. Next in numbers are the men in CCC camps, another federal project that has had time to be thoroughly organized.

Other federal projects account for nearly all the remainder, with local projects a small number, but now showing a rapid acceleration as the various local bond issues begin to come through.

The accompanying table (p. 183) shows the figures up to Dec. 31, 1933. "Indirect" employment in the manufacture and transportation of materials is not included, owing to the fact that no valid method of computing it has been found. Secondary employment caused by spending of PWA wages is of course impossible to estimate, except by referring to the general business curves and guessing how much was due to PWA.

The future of public works

In 1934, as the local projects already allotted come into full action, there will be a noticeable amount of direct employment under the PWA, with perhaps a corresponding reduction of the number employed by the CWA. Possibly there may be additional funds provided, in view of the fact that the total of applications on file in the PWA exceeds the appropriation by nearly three billion dollars. The amount of secondary employment produced will depend largely on whether the public recovers from the economy complex, but it seems evident that in any case an enlarged program will be required as a permanent feature if the construction industry is to be employed without excessive commercial building.

In a stabilized economic system of high productivity public works have a definite place as a balancing mechanism through which the utilization of surplus income and surplus labor can be controlled. Before such a system can be established, however, the present situation will have to be clarified and the imminent dangers of the immediate future will have to be avoided.

At present the United States, together with most of the world, is in a condition that indicates an early upturn of business. Although in this country the business liabilities created before 1929 have been only partly scaled down, the physical equipment of industry is obsolete at numerous points. In view of the effect of new investments, especially in automatic machinery, upon existing operators and existing capital structures, the addition of any large amount of new long-term capital to industry would undoubtedly bring on a collapse more rapidly than in the boom period of 1922-'29.

All the materials are at hand for a swift recovery based on what may be called a "sound-money" policy and for continuing its rise at an increasingly rapid rate by the fiat money created by rising stock values. History teaches that such a "normal" inflation always runs away and that no practical means of controlling it are at hand. But with a sound-money inflation once under way and out of control, the only place of federal public works would be in the wastebasket, for the advocates of federal economy and municipal and industrial borrowing would carry public sentiment before them irresistibly. Fortunately, the President has already declared his intention of preventing a speculative outburst, and on several occasions has shown the will to carry out this intent.

Three fundamentals

The following points may be mentioned as typical of the kind of approach needed if an adequate public-works program is to be used to bring on a prosperity that will not collapse like the last one.

First, as to temporary financing, bonds should not be sold to the public; they would merely have to be paid off later during good times, which would have an upsetting effect by injecting liquid funds into a rising speculative market. The only sound method of financing a public-works program is to sell bonds to the Federal Reserve System in return for fiat credit; this is inflation, of course, but it is controllable inflation—and it is the only controllable inflation of which we have knowledge. If the government is powerful enough to lay and collect suitable income taxes, this type of federal inflation will cease automatically upon the establishment of good times, as happened after the heavy inflation used in financing the World War.

Second, as to the size of the required program: the United States is losing at least fifty billion dollars of national income per year by continuing the depression. Therefore, whatever it costs to kill the depression, the result is worth the price. The public-works program should be large enough to give at least twice the effect of the present CWA program, and even more if found necessary.

Third, there is the necessity of avoiding bootstraps: Money that adds to business or municipal debt or comes from sales taxes—i.e., out of the consumer—cannot help business to recover and stay recovered. All clever devices for giving father a new car and sending him the bill are of little help to father. A public-works program is an ineffective device unless the money to pay for it comes out of taxes on surplus income. Unfortunate though it be, there is no way to make the capitalist system stay in balance in a highly productive economy such as our present one without drastic income taxes.

The next public-works bill

The details of a new public-works bill are yet to be worked out, but a number of modifications have already been proposed. In general, it is clear that private projects have been so disappointing (except for railroad loans) that they should be excluded. On the other hand, federal projects should be widely extended. The Mississippi Valley Committee, a distinguished body of technicians in the PWA, is beginning a study of that river in respect to flood control, soil erosion, power, irrigation and navigation, which furnishes an example of the kind of plan needed. Local projects of the municipal-loan type should be limited to a few special purposes, such perhaps as water, electricity and gas plants. The 100 per cent grant, now given only for roads, might be extended to sewers, to hospital and school-building construction, all of which are affected by a national interest; perhaps to some extent also to recreational planning. But in general the 100 per cent grant needs cautious handling, since it may atrophy local initiative and responsibility.

By amendment and changes of this kind the new public-works bill that now seems likely to be enacted can be made in every respect constructive as an aid to recovery as well as stabilization. And the new program, whatever its form, should be visualized as permanent, for public works as an essential element in sound economic management of the country are here to stay.

PROGRESS MADE ON LARGE ENGINEERING PROJECTS

Municipal Water-Supply Systems

Hetch Hetchy Water Supply—Holing through of the last section of the 28.5-mile Coast Range tunnel on Jan. 5 completes four years of tunnel-driving on this last major feature of the aqueduct system which will deliver mountain water to San Francisco by gravity. All the other sections have been completed and lined. Lining will be rushed in the last division, and the present plans call for delivery of water before June of this year. Connections are under way between the portals of this tunnel and the San Francisco Bay crossing on the west and the 47-mile San Joaquin pipe line connecting with the mountain divisions to the east.

✦

Bouquet Canyon Dam—Work was practically complete at the end of the year on the 165-ft. rolled earthfill Bouquet Canyon Dam, built by the Los Angeles Bureau of Waterworks and Suply to provide 33,000 acre-ft. of off-the-line storage for improving the operating conditions on the Los Angeles Aqueduct. Contract was let in July for a 4-mile welded-steel pipe line to connect the reservoir with the Owens Valley Aqueduct at the upper end of the penstock leading to San Francisquito power house No. 1.

✦

El Capitan Dam — Work has continued throughout the year and is approaching completion on the 240-ft. hydraulic-fill dam being built on the San Diego River by the city of San Diego to provide an addition to its water-supply system. In addition to the central hydraulic-fill section, the structure has extensive rockfill embankments on both faces and arched concrete toe dams to prevent possible spreading of the fill. Other features of the project consist of an 1,150-ft. diversion tunnel, ultimately used for outlet, and an outlet tower. At a later date a separate contract will provide for the building of an 8-mile pipe line to connect with the city system.

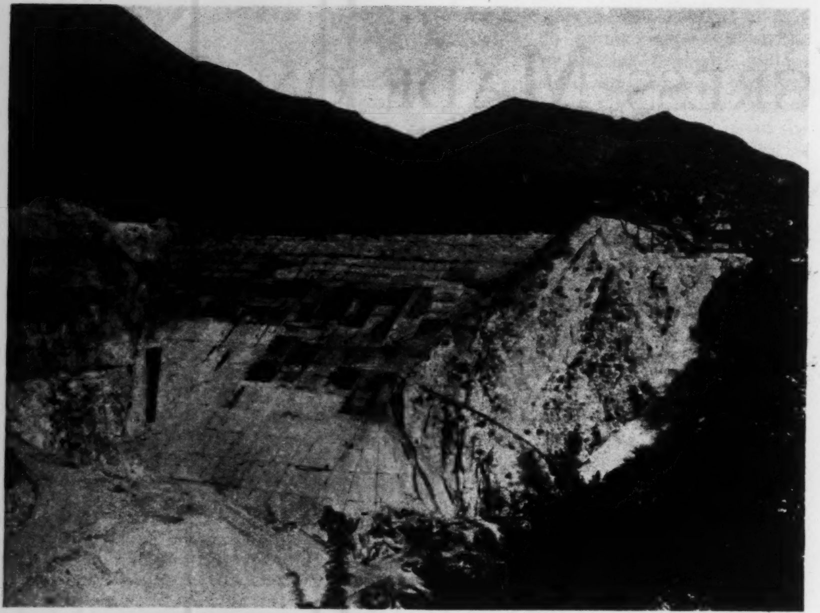
✦

Colorado River Aqueduct—Fast work in getting the aqueduct construction program of the Metropolitan Water District of Southern California under way during 1933 resulted in completing all of the extensive preliminary operations, which included a $700,000 construction water supply, 150 miles of roads and almost 400 miles of power lines along the 241-mile route from the Colorado River to the terminal reservoir site about 40 miles southeast of Los Angeles. Tunnel-driving by the many separate contractors and the force account includes adits aggregating almost 2 miles and main heading totaling 8 miles. On the San Jacinto Tunnel, the longest between headings (8.3 miles), the deep Potrero shaft will not be compelted until April. According to contract, most of the tunnels are to be finished by June, 1938. Prior to that time the construction program calls for the building of the connecting canal and conduit sections to complete the aqueduct. A contract has been executed with the Bureau of Reclamation for building the diversion dam on the Colorado River at Parker.

✦

Moffat Tunnel Water Diversion—A referendum required by the PWA on $3,500,000 bonds that Denver proposes to put up as collateral for a loan for completion of the Moffat Tunnel water-diversion project was approved by the electors on Jan. 23, 1934. Out of current funds the city has 80 men at the West Portal camp enlarging the tunnel betwen the shaft and the apex. The inlet shaft to bring in water from Fraser River and Jim Creek has been holed through and is ready for lining. More than a mile of tunnel was enlarged dur-

Pine Canyon Dam—Only finishing touches remain to complete Pine Canyon Dam, now being built by the Pasadena (Calif.) Water Department to supplement the present municipal pumped-water supply. The reservoir created by this 325-ft. concrete gravity dam on the San Gabriel River will store 40,000 acre-ft. The structure is designed to provide for possible movement on a fault through the site. Construction is under way on an 18-mile steel pipe line to connect the reservoir with the city distribution system. Ultimately the reservoir will become a part of the terminal storage system of the Metropolitan Water District.



San Gabriel Flood Control—Dam No. 2, the 255-ft. rockfill structure on the west fork of the San Gabriel River, being built by the Los Angeles County Flood Control District, has been practically completed. The reservoir provides 14,000 acre-ft. of regulatory storage as a major feature of the flood-control program. The structure contains about 1,000,000 cu.yd. of fill and has a laminated gunite facing. Work on the record-breaking No. 1 dam below the fork of the river was started during the year with operations concentrated on driving and lining the 2,000-ft. diversion tunnel, which has a 30-ft. finished diameter, excavation of the site and stripping of the quarry. Streambed has been prepared for the start of rock placing. Volume of quarry stripping approaches 1,000,000 cu.yd. This dam will be 360 ft. high.

ing the year, and the first of the diversion dams on the Fraser River was built.

◆

Milwaukee Water Improvements—A $4,600,000 loan and grant for a water-purification plant for Milwaukee has been approved by the PWA, and preliminary plans and estimates have been completed. Already bids have been taken on the washwater tank and an experimental section of the cofferdam inclosing the site in the lake. Awards await signing of the bond contract. Two elevated welded-steel storage tanks and a booster station, in which one 30 m.g.d. pump unit has been installed, are ready for test and will be put in service in June when needed to care for the summer peak loads in the low-pressure area served.

◆

Boston Water Supply—Extension of the Wachusett-Swift aqueduct tunnel of the Boston Metropolitan water-supply system from the Ware River west to the Swift River, 10 miles, is well along. Excavation of the tunnel has been completed, and concrete lining is more than 50 per cent complete. The pneumatic-caisson corewall at Quabbin Dike is practicaly complete. The embankment contract has not as yet been let. No progress was made during the year on the main dam on the Swift River, which, with the Quabbin Dike, will create the Quabbin Reservoir, main source of supply in the new sytem. The diversion tunnel was completed over a year ago. Construction of the pneumatic-caisson corewall and earth dam at this point has been delayed pending disposition of a railroad running through the site. During the past year many miles of relocated highway were built.

◆

New York City Water Supply—The 20-mile water tunnel, known as City Tunnel No. 2, extending from Hillview Reservoir, Yonkers, through the boroughs of the Bronx and Queens and into south Brooklyn, was completed during 1933, except for the construction of the drainage chamber and temporary superstructure, the installation of equipment in the drainage chamber and shaft and in the gate and valve chambers, and the laying of some of the pipe connections with City Tunnel No. 1 in Brooklyn. Contracts for the necessary equipment, involving an expenditure of about $1,000,000 may not be let until the necessary funds are available.

◆

Springfield, Ill., Impounding Lake—Water is now being impounded in the new lake at Springfield, Ill. Sewers, pumping stations and treatment plants are being provided to divert sewage from the marginal land that ultimately will be developed for recreation. A 1,000-ft. sand beach separated from the lake by sheetpiling to form a swimming pool has been provided with pump, chlorinator and circulating system. Excavation is complete for the new main pumping station. Other items that will go ahead in the spring are a filter plant, water mains and power lines.

◆

Milwaukee Sewage Treatment—With $1,850,000 of PWA funds, extensions to the Milwaukee sewage-treatment plant have been under way since last fall. Two major contracts have been let: (1) a cofferdam in Lake Michigan east of the present plant with which was incorporated dredging and backfilling and driving of foundation piles for the aeration and sedimentation tanks; (2) aeration tanks, sedimentation basins and appurtenant channels which should be completed this summer. Other contracts, principally for equipment, were let late in the year. Bids are now being asked on additional equipment, and proposals will soon be asked for additional items. When completed, the plant will serve the needs of the district until 1945. The new type of twin sedimentation tank being built for the sewage-treatment plant is shown in the foreground. The tanks are rectangular and will be equipped with two-armed sludge removers.

Power, Waterways and Flood Control

Boulder Dam — Progress on the Boulder Dam in the Black Canyon of the Colorado River, being built by the Bureau of Reclamation, was described in detail in the issue of Dec. 21. At the end of the year the concrete yardage in the dam had passed the 1,000,000-cu.yd. mark and was approaching one-third of the total in the structure.

✦

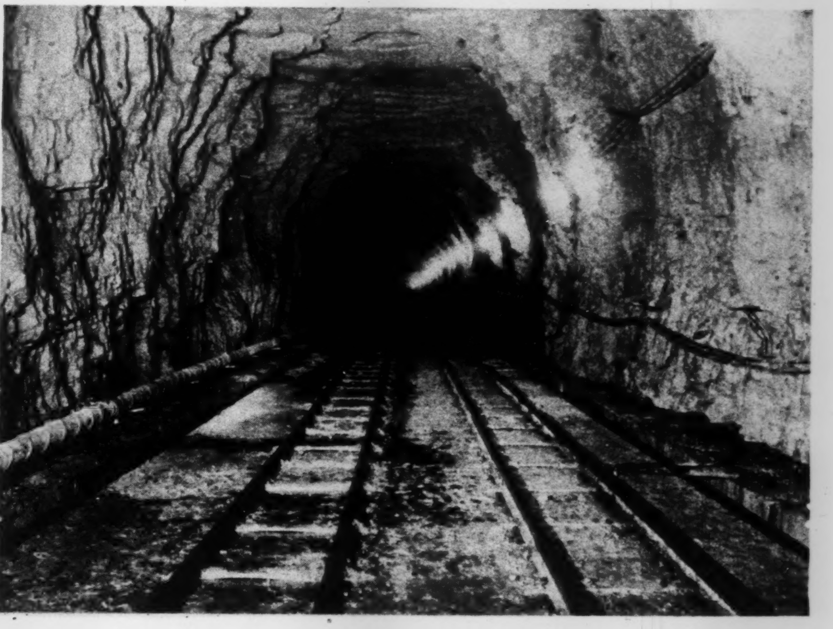
Bonneville Dam — Work on the $31,000,000 Bonneville Dam, locks and power development on the Columbia River about 40 miles above Portland was begun by the U. S. Engineer Corp. in November. Present work at the site consists of constructing earth-dike cofferdams to divert the river into the channel on the north (Washington) side of the island to make the south channel available for dam and power-house excavation. Core drilling has been rushed to permit the designs to be completed for the major features of the project. Cofferdam construction was delayed about 30 days as a result of the unprecedented high water in the river during the latter part of December. The PWA has allocated $20,250,000 to the project. Six 60,000-hp. turbines are to be installed.

✦

Grand Coulee Dam—Preliminary work has been under way for some months on the Grand Coulee Dam, a 700,000-hp. hydro-electric power project being built by the Bureau of Reclamation on the Columbia River in central Washington. The first contract for the excavation of 2,000,000 cu.yd. of overburden from the site is advancing rapidly. The remainder of the large volume of excavation will be a part of the main dam contract. One of the major preliminaries will be the construction of an 1,160-ft. suspension bridge to provide access across the river below the site. Bids on this $400,000 structure will be called soon. The building of a branch railroad to the site has been temporarily held up as a result of ICC hearings on the feasibility of truck transportation. Building of the construction camp of the bureau will be started in the spring. Plans call for the advertising of bids for the main contract early in the spring with actual construction starting about May. The present undertaking, building the dam to a height of 145 ft. with provision for an ultimate height of 370 ft., is estimated to cost $63,000,000.

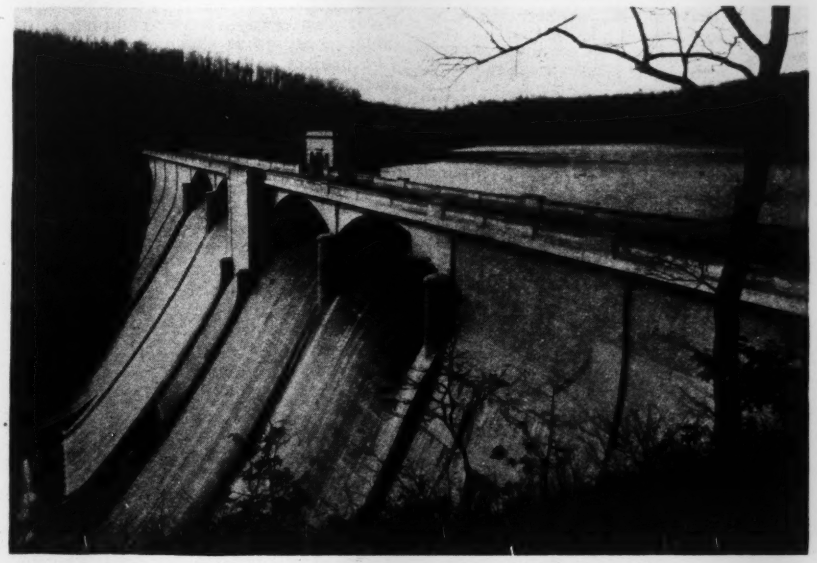
✦

Tennessee Valley Development—On May 18 President Roosevelt signed an act providing for coordinated development of the Tennessee River Valley under the direction of the Tennessee Valley Authority. The President was authorized under the act to turn over to the Authority the power plants at Muscle Shoals (Dam No. 2), and the Authority was authorized to build other power plants, including the Cove Creek power and storage dam, to sell electric



Chicago Ave. Water-Supply Tunnel—The 16-ft. Chicago Ave. water tunnel, Chicago, has been excavated complete from the Denver crib to Central Park Ave. except for 2,600 ft., from which stone is being taken for the concrete lining. Similarly a 13-ft. branch south along Central Park Ave. to the station is completed except for 2,000 ft. being mined for the stone. To the north a 10-ft. branch to the Springfield Ave. station is completely excavated from the crib west to Ashland Ave. the 16-ft. tunnel is lined, and the floor is in for all of the excavated portion. Concrete-placing machinery is now being assembled to line the western portion of the 16-ft. section and the branches. The tunnel is expected to be completed by the end of the year. The new 300-m.g.d. Cermak pumping station (formerly Harrison St.) is expected to be completed this year. It will have six 50-m.g.d. motor-driven centrifugal units operating against 123-ft. head. The old station has been removed, and excavating of the new pump pit is in progress.

Prettyboy Dam, Baltimore—Adding 20 billion gallons of storage to Baltimore's water supply, Prettyboy Dam was completed during September. Early in April the work had advanced sufficiently to permit the impounding of water in the reservoir. During the following months the rainfall was abnormally high so that water flowed over the crest on Sept. 23. The total cost of the dam and reservoir project was $4,110,000, including $2,383,700 for the dam itself, $431,400 for roads, $237,500 for bridges and culverts, and $642,100 for land.



Caughnawaga—Ville Lasalle Bridge—Construction of a publicly owned toll highway bridge across the St. Lawrence River at the head of the Lachine Rapids, 12 miles upstream from Montreal, has advanced to the point where it is anticipated that the bridge will be ready for use in the summer of 1934, a full year ahead of schedule. Pneumatic caissons were used for eleven of the thirteen main piers, depths to rock ranging up to 65 ft. below water level. Steel erection is well advanced. The total length of the bridge and approaches is 6,070 ft. Nine of the main spans are steel deck trusses, and the tenth is an arch span.

power and carry on general development work. Soon after the Recovery Act was passed, the PWA allotted $50,000,000 to the TVA. Construction of Cove Creek Dam was begun in the early fall, and subsequently construction of Dam No. 3 was begun under orders from the President. Locks at that dam already were under construction. Construction of a transmission line from Cove Creek Dam to Muscle Shoals is under way.

✦

Rio Grande Flood Control—Rectification of the Rio Grande channel from El Paso to Box Canyon below Fort Quitman, a distance of 155 miles by the present channel, was provided for in a treaty between the United States and Mexico in February, 1933. The total cost of the work to be assumed by the United States, including Caballo Reservoir, is estimated at $5,300,000. Late in December the PWA allocated $2,800,000 to the project. Construction is to go ahead immediately. Earlier in the year the PWA allotted $1,500,000 to emergency flood-control work on the lower Rio Grande.

✦

Rio Grande Conservancy District Work—Irrigation of about 122,000 acres of land in the Middle Rio Grande Valley, construction of 160 miles of levees, 380 miles of drainage canals and 510 miles of irrigation canals, involving the moving of 25,000,000 cu.yd. of earth, is included in the river control, flood protection, drainage and irrigation project of the Middle Rio Grande Conservancy District. By Jan. 1, 1934, 22,100,000 cu.yd of earth had been moved, and the remainder of the earth work is expected to be complete by Oct. 1. The project also includes a 198,000-acre-ft. storage reservoir with a dam 180 ft. high, which is a gravel fill with a steel face, four diversion dams across the Rio Grande, and two headings without diversion dams. The two headings and one diversion dam are completed, and the other three diversion dams are under construction, being respectively 20 to 90 per cent completed. The total estimated cost of the project is $10,337,000, of which $5,311,000 has been expended. The Conservancy District in October, 1932, received a loan from the RFC of $5,784,000 to complete the project.

✦

Rodriguez Dam, Mexico—Work on Rodriguez Dam on the Tijuana River in Mexico, 27 miles southeast of San Diego, Calif., the highest buttress-type dam yet undertaken, is about 70 per cent completed. Work was begun in 1929 but was discontinued from late in 1930 to late in 1931. Increased appropriations this past year have made it possible to speed up construction.

✦

All-American Canal—An allotment of $6,000,000 from the PWA toward the first year's work on the All-American Canal in southern California resulted in a call for bids in November on the first section of the canal. Bids received were rejected late in December because they were higher than the engineer's estimate.

✦

Madden Reservoir, Canal Zone—The main dam for the Madden Reservoir in the Canal Zone is well along toward completion. Most of the small earth and rockfill dams around the edge of the reservoir were completed in 1932, and the remainder were completed in 1933. The project is expected to be completed this year.

✦

Lake Okeechobee Flood Control — Work is actively under way under the direction of the U. S. Army Engineers on the combined flood-control and navigation project for Lake Okeechobee, Fla. The general plan of operation is to dredge a navigation channel along the east and south shores of the lake, throwing the excavated material up on the shore to form a levee to keep the lake within bounds during flood and high-wind stages. Recently contracts totaling $5,500,000 were let for 47 miles of levee and navigation and floodway channels, for four hurricane gates across canal intakes at the lake, and six drainage culverts. A contract has just been completed involving 7 miles of levee at a cost of $560,045.

✦

Mississippi Flood Control—Work on flood control on the lower Mississippi River under the program adopted in 1928 was considerably retarded due to lack of funds during part of the past year but was taken up actively after $44,000,000 had been made available by the PWA. The Birds Point-New Madrid setback levee was completed in August with a total of 10,993,000 cu.yd. placed. As an unemployment measure, the Mississippi River Commission during the latter part of the year put under way the largest concrete revetment program that it has even undertaken. The entire project is rapidly approaching the objective sought in the Flood Control Act of 1928.

✦

Bonnet Carre Spillway—Bridges are the principal elements remaining to complete the Bonnet Carré Spillway, a relief channel from the Mississippi River above New Orleans to Lake Pontchartrain. A contract for the highway bridge across the channel was let late in the fall and since the first of the year agreement has been reached between the three railroads whose lines cross the spillway and the federal government whereby the government will pay $4,333,000 to the railroads on their claims. Construction of two of the bridges will be undertaken soon, and the third will be built as soon as right-of-way for a new location can be secured.

✦

Upper Mississippi River Waterway—About half of the 26 lock and dam operations included in the Upper Mississippi River waterway were completed or under contract at the end of the year. The project calls for creation of a 9-ft. slackwater channel from St. Louis to the Twin Cities. The PWA has allotted a total of $33,500,000 to the work.

✦

Missouri River Waterway — Allotments totaling $17,753,000 were made late in August by the PWA to the War Department for the completion of the 6-ft. waterway from Kansas City to Sioux City through the establishment of revetments and permeable dikes to stabilize the navigation channel. As the Army Engineers' plans for the work were complete, it was put under way soon after the money became available.

✦

Fort Peck Dam—Construction of a 14-mile spur line by the Great Northern Railway to the site of Fort Peck Dam, 23 miles southeast of Glasgow, Mont., was undertaken late in the year.

The dam site has been cleared. In all, contracts totaling more than $500,000 have been let for construction and equipment. The dam will be a hydraulic fill 231 ft. high and 8,500 ft. long at the crest. Four 20-ft.-diameter diversion tunnels will be among the first items of construction. The project is expected to take five years to build and will cost $73,000,000. It is chiefly for flood control and river regulation.

◆

Ohio and Kanawha River Dams—The two roller-gate dams under construction on the Kanawha River at Marmet and London, W. Va., are about complete. Contract was let in October for twin locks at Winfield, W. Va., the third and last project on the Kanawha for the improvement of navigation on that river. Work has been started on the twin locks on the Ohio River below Gallipolis, Ohio, a project that will control the Kanawha from its mouth to Winfield and will also be part of the Ohio River improvement program. At Montgomery Island, 30 miles below Pittsburgh on the Ohio, the twin locks are about complete and contract has been let for the dam, which will be of the lift-gate type. Lock and dam No. 2 on the Allegheny River just above Pittsburgh are about complete, as is also Lock No. 3 farther upstream. Dam No. 3 at this latter project has just been awarded.

◆

Illinois Waterway—The year 1933 saw the completion of the 327-mile, 9-ft. waterway from Lake Michigan to the Mississippi River. Navigation started March 1, and the dedication was a World's Fair event June 22 during Engineers Week. The waterway is handicapped by Chicago Sanitary District bridges which have only 16½-ft. clearance, but despite this 112,000 tons were carried under them. Between Starved Rock and the mouth of the Illinois River 300,000 tons were carried. Looking to the time in 1938 when the diversion from Lake Michigan is reduced to 1,500 sec.-ft., new locks and dams at La Grange and Peoria are recommended and asked for in a report to Congress by the Chief of Engineers.

Bridge Construction

Golden Gate Bridge—The north tower of the Golden Gate Bridge, being built by the Golden Gate Bridge and Highway District, is now more than 300 ft. above the water (concrete pier top El. 44); ultimately it will rise to El. 750. The anchorage on the same side is completed for the first stage, including the placing of the lower and middle tiers of eyebars. The south (San Francisco) anchorage is also well advanced, including the placing of eyebar steel. The most difficult feature of the work, building the south pier about 1,000 ft. out from the San Francisco side of the Golden Gate, exposed to swift tidal flow and ocean storms, is under way. The site has been excavated by subaqueous blasting and dredging from about El. —55 to El. —95 with the exception of some of the area to be occupied by the fender system. The trestle providing access to the site, which was destroyed by storm, is being rebuilt. Work on both approaches is under way, including the cable-bent towers.

◆

San Francisco-Oakland Bridge—Foundation work is advancing rapidly on both channel crossings of the bridge being built by the state of California as a publicly owned toll structure between San Francisco and the East Bay communities. In the 10,000-ft. west channel, which will be spanned by two 2,300-ft. suspension spans, the most westerly pier has been completed, and one of the caisson piers is approaching rock foundation at El. —180; and two of the other three, including the 97x197-ft. central anchorage, are well into the mud. On Yerba Buena Island, which will be pierced by a 500-ft. double-deck tunnel, the extensive open-portal excavation has been completed, and advance grouting is under way to provide a shield overhead through the weak rock. In the east channel crossing, which will be spanned by a series of trusses, including one 1,400-ft. cantilever, one of the caissons has been sunk to final depth at El. —170 and is being sealed; a second caisson is approaching final depth, and the remaining caisson unit, which will go to the record depth of 235 ft., will be started as soon as the equipment is released from the other two. Work is advancing rapidly on the short approach spans at the east end. Also at this end contract has been let for the long earth and rockfill leading out to the point where the bridge structure begins.

◆

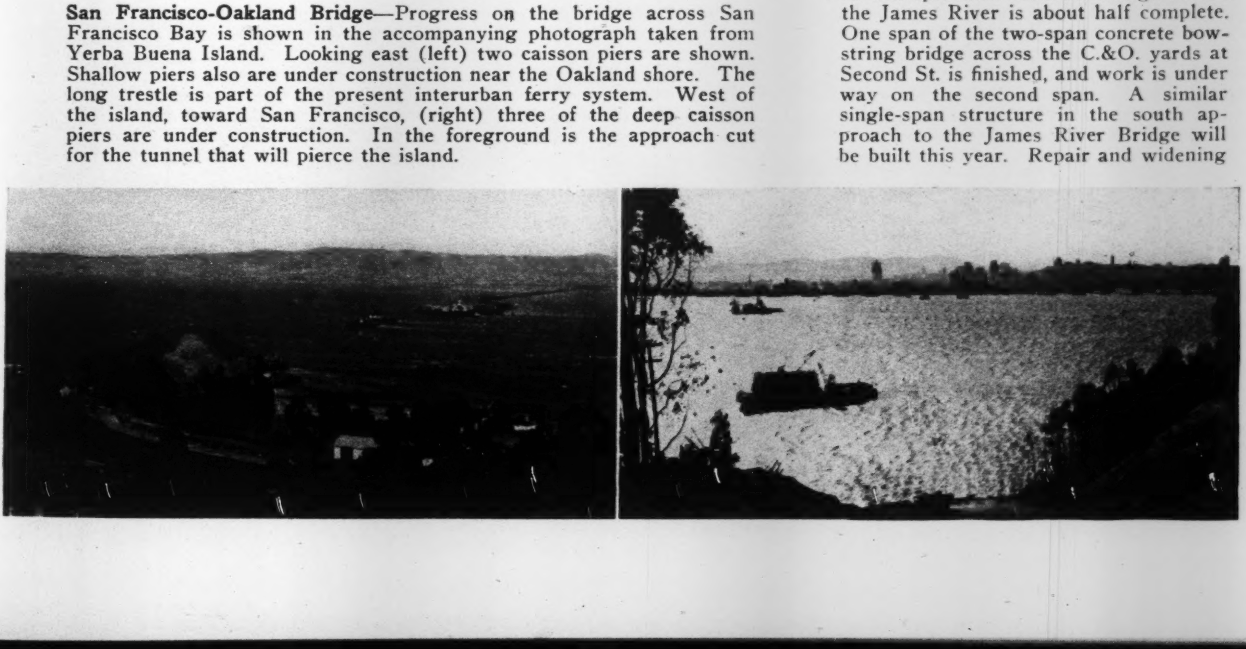
Missouri River Bridge, Kansas City—The entire substructure of the bridge being built across the Missouri River by the Regional Bridge Co. with an RFC loan is complete with the exception of three or four of the approach piers. All of the pneumatic-caisson piers have either been completed or concreted well above the water line. In addition, the 40-ft. steel beam span and three 80-ft. deck truss spans of the south approach have been erected, and the floor system of the adjacent 300-ft. span has been assembled on falsework. Progress has been affected considerably by low water, which has handicapped floating equipment. The main river bridge is a cantilever structure with a 447-ft. main span and 417-ft. anchor spans. The pneumatic caissons went down about 100 ft. The south approach of this bridge connects with the new 7th St. Trafficway in Kansas City, Kan. Construction of this approach is proceeding, using CWA labor. Two viaducts were recently contracted, one over the M.K.T. and Frisco tracks and the other over Turkey Creek south of the Kansas River on this Trafficway.

◆

Morgan City Bridge—This structure, built by the Louisiana highway department over the Atchafalaya River, was opened to traffic in December. The main river crossing consists of three 608-ft. through-truss spans that were floated into place complete. Foundation construction was difficult and notable, one of the piers being sunk to the unusual depth of 176.5 ft.

◆

Richmond Bridges — The extensive highway bridge program under way at Richmond, Va., will be completed this year. Two long continuous-girder concrete viaducts at First and Fifth Sts. have been opened to traffic. The 3,800-ft. multiple-arch concrete bridge across the James River is about half complete. One span of the two-span concrete bowstring bridge across the C.&O. yards at Second St. is finished, and work is under way on the second span. A similar single-span structure in the south approach to the James River Bridge will be built this year. Repair and widening



San Francisco-Oakland Bridge—Progress on the bridge across San Francisco Bay is shown in the accompanying photograph taken from Yerba Buena Island. Looking east (left) two caisson piers are shown. Shallow piers also are under construction near the Oakland shore. The long trestle is part of the present interurban ferry system. West of the island, toward San Francisco, (right) three of the deep caisson piers are under construction. In the foreground is the approach cut for the tunnel that will pierce the island.

of the existing Marshall St. steel viaduct is under way.

✦

Rip Van Winkle Bridge — Work on the Rip Van Winkle Bridge over the Hudson River, connecting Catskill and Hudson, N. Y., has progressed steadily during the past seven months since the contract was awarded, and the expectation is that the bridge will be completed by January, 1935. The steel structure of the bridge is supported on steel towers erected on masonry piers and is 5,040 ft. long between abutments, including a main cantilever span of 800 ft. and two 400-ft. anchor spans. Of the four river piers, three were built in sheetpile cofferdams and are completed. The fourth pier, being constructed as an open caisson, is now at El. —70, within about 20 ft. of rock. Work on the shore piers and abutments is well along, and steel erection is scheduled to start as soon as ice conditions permit.

✦

Triborough Bridge, New York—The award of a contract in November for the construction of the steel towers of the 1,380-ft. suspension span over the East River near Hell Gate at New York marked the resumption of work on the project after more than a year's delay, following construction of foundations for the suspension span and for some of the viaduct on Ward's Island. The project is being financed by a combined PWA loan and grant of $44,200,000 to the Triborough Bridge Authority. Since the loan was made, the steel tower contract has been awarded, property has been acquired for both the Bronx and Queens approaches, and bids have been received for viaduct foundations on Randalls Island and for the Little Hell Gate crossing.

✦

West Side Elevated Highway, New York—During the year, the foundations for the section of the highway viaduct along West St. & 12th Ave. between 38th and 46th Sts., Manhattan, were completed, and at the end of the year the superstructure contract was let. Plans for the section between 46th and 59th St. were in progress after being delayed until the location was fixed around the new ocean-liner piers under construction in that area. The highway is in operation from Canal to 38th Sts. and from 59th to a connection with Riverside Drive at 72d St.

✦

Grand Island Bridges, Niagara River—Work on the substructures of the two Grand Island bridges, being built by the Niagara Frontier Bridge Commission, is adhering to schedule requiring that the foundations be completed by Aug. 15, 1934. The two bridges span the east branch of the Niagara River, one from the city of Tonawanda to the south end of Grand Island and the other from the north end of Grand Island to the city of Niagara Falls. Both bridges are of the arched cantilever type. The South bridge has five spans over the river ranging from 280 to 600 ft. in length, while the North bridge has thirteen spans ranging from 150 to 500 ft. Piers under the river spans are carried to rock, those for the South bridge being built by the pneumatic process and those for the North bridge in open cofferdams. Foundations for the North bridge are actively under way, and work is commencing on the South bridge caissons. Part of the steel superstructure is being fabricated.

Belt Bridge, New Orleans—Substantial progress in foundation-sinking and approach steel erection has been made on the combined highway and railway bridge across the Mississippi River 10 miles above New Orleans. The bridge is being built jointly by the Public Belt Railroad and the Louisiana State Highway Commission with a $13,000,000 RFC loan, and will carry two railroad tracks and two 18-ft. roadways. Included in the river crossing is a 790-ft. cantilever span with a vertical clearance of 135 ft. Of the four piers of the main river, the deepest of which go down about 170 ft. below low water level, two are being dredged through artificial sand islands, and preparations are under way to begin work on the other two. One other river pier is sealed. Long approach viaducts are required on either side (141 bents on the east approach, 174 on the west); at the end of the year the east approach steelwork was erected. West approach foundations are 50 per cent complete.

Sewage Treatment

Duluth Sewage Plant—The first step in a comprehensive plan to handle the sewage of Duluth, Minn., was completed last fall. It comprised 8 miles of interceptors and mains, five pumping stations, a treatment plant of the separate sludge-digestion type for 20,000 people and a chlorinating station to serve 60,000 people. Ultimately this station will be a pumping station to force sewage to the Westerly treatment works.

✦

Springfield, Mo., Sewers—Bond contract has recently been executed for a $1,000,000 PWA loan and grant (allotted the middle of October) to build a sanitary trunk sewer, storm sewers and channels and two sewage-disposal plants for Springfield, Mo. The 25 plans for the work are essentially complete, and bids will be asked shortly.

✦

Sanitary District of Chicago—No construction work was done during the year 1933 on the program of the Sanitary District of Chicago, due to lack of funds. At the end of 1933 the population equivalent under treatment was 2,503,000 of an equivalent population of nearly 6,000,000. In December $42,000,000 of bonds was purchased by PWA, and construction will soon be active. Work on old contracts totaling $8,000,000 stopped two years ago for lack of funds and will now go ahead. Plans are ready for $6,000,-

Kansas River Bridge—At the south end of the new Seventh St. Trafficway in Kansas City, Kan., this deck cantilever and its approaches, completed at the end of the year by the state highway department, provides a high-level route over railroad yards and the packing-house district. The Regional Bridge over the Missouri River at the opposite end of the Trafficway is some 6 miles north (to the left in the view).

000 of new work, and plans for $27,000,000 more work in 1934 soon will be in shape, largely for work on the Calumet and West Side projects. A five-month delay on treatment plants is in prospect awaiting a survey by a consulting board yet to be named by the PWA.

◆

Oshkosh, Wis., Sewage Treatment Plant—Last year Oshkosh, Wis., built the first section of a comprehensive plan, $1,250,000, of sewage disposal and intercepters costing $160,000. The interceptors divert the sewage from that portion of Winnebago Lake front where pollution would most affect the water supply and bathing beaches. The PWA has allotted $900,000 for the project. The request was on general obligation bonds but changed to sewer revenue bonds. One of the PWA conditions was for the council to vote sufficient revenue charges to service the bonds. Council failed to pass this ordinance but the allotment still stands and latterly there is a feeling that the council will soon reverse its action and comply with PWA requirements.

◆

Minneapolis-St. Paul Sanitary District—Organized in October, the Minneapolis-St. Paul Sanitary District has adopted the sewage-disposal project and three-year construction program outlined by the old Metropolitan Drainage District which it replaced. The PWA has allotted $18,000,000 to the work, and bids soon will be taken on $1,000,000 worth of work for which plans are complete. Each city will have charge of the design and construction of that part of the work to be used exclusively by it, $3,240,000 for Minneapolis and $2,350,000 for St. Paul. The remaining joint work is to be handled by the district.

◆

Columbus Sewage Treatment — General plans for a new 50-m.g.d. sewage plant for Columbus, Ohio, have been approved by the Ohio department of health, and the application of the city to the PWA for a loan has been approved. The legality of the proposed method of financing this improvemnt has been questioned by bond attorneys as being in conflict with existing laws of Ohio. The case has been heard by the Ohio Supreme Court, and the exact status of the proposed plan of financing will not be known until the court decision has been rendered. Detailed plans are being prepared as rapidly as possible by the city.

◆

Cleveland Easterly Sewage Works—The Easterly sewage-treatment plant of Cleveland, Ohio, which is designed to serve 770,000 people and is estimated to cost $12,000,000, has been under construction during the past year, and work upon the project in the amount of about $4,500,000 has been completed. There is now under contract work costing about $1,500,000. Funds for the work amounting to $7,000,000 are being suppiled by the PWA. The design of the remaining part of the work is progressing, and it is expected that bids will be asked for as rapidly as possible.

◆

Wards Island Sewage Plant—Work on the construction of an activated-sludge plant for New York City with a rated capacity of 180 m.g.d. was started on Wards Island in June, 1931. Contracts for the construction of the tanks and operating galleries, also for a dock and seawall were completed during 1933 at a cost of about $4,500,000. No new contracts have been awarded during the past year because of lack of funds. Plans for the entire project, including the treatment plant and the intercepting sewers, are essentially complete.

Railways and Rapid Transit

Pennsylvania Station, Philadelphia—The main waiting-room and concourse of the new Pennsylvania Station at 30th St. in Philadelphia was put into service on Dec. 15. Through traffic now uses this station in place of the old Broad St. Station, and suburban traffic uses both the suburban section of this station and the new underground station north of the old Broad St. Station. The project now is 90 per cent complete. The old Broad St. Station and the elevated approach has yet to be removed to make way for Pennsylvania Boulevard, a broad approach to the station, including a new bridge across the Schuylkill.

◆

Pennsylvania R.R. Electrification—Early in November the PWA approved a loan of $84,000,000 (later reduced to $77,000,000) to the Pennsylvania Railroad for the completion of its electrification program between New York and Washington. Included therein was $2,600,000 for reconstruction work at Baltimore, begun sometime ago but discontinued, and $2,000,000 for reconstruction of the Virginia Ave. tunnel in Washington. Electric operation of passenger service between New York and Philadelphia was begun in January, 1933, and through trains now operate by electric traction as far south as Wilmington, Del. Electrification work, Wilmington to Washington, is 25 per cent complete. The railroad had spent $67,000,000 on the program at the time the new loan was approved.

◆

Los Angeles Union Station — Work has actually started on the $9,000,000 union passenger terminal for Los Angeles, which will be built and used jointly by the Southern Pacific, Union Pacific and Santa Fe Railroads. The active stage of the project follows years of delay and controversy extending up to the U. S. Supreme Court. The work now being undertaken is building underpasses for two streets that are required before the terminal work can start.

◆

Railway Track Elevation, Syracuse, N. Y.—Actual construction on the long-projected elimination of the New York Central tracks from the streets of Syracuse, N. Y., was begun during the year. The project calls for about six miles of new three-track elevated line together with bridges and retaining walls, following the present location of the West Shore Railroad through the city. A new freight yard and station buildings are included. A contract has been let for all work to subgrade, including bridges, which work will take about two years. Station-building contracts are yet to be let. Immediate work is confined to the freight yard and the various steps necessary before taking traffic off the West Shore line.

◆

West Side Track Elevation, New York—The new freight terminal of the New York Central railroad north of Canal St. was practically completed at the end of 1933 as was the track viaduct north from the terminal to the 30th St. yard. The viaduct around the yard was completed. Construction of the depressed track north of the yard to the 60th St. yard has been held up pending construction of an intercepting sewer, 33rd to 59th Sts., now about completed. The project will remove the railroad company's track from about 5 miles of streets. The cost is estimated at $138,000,000.

◆

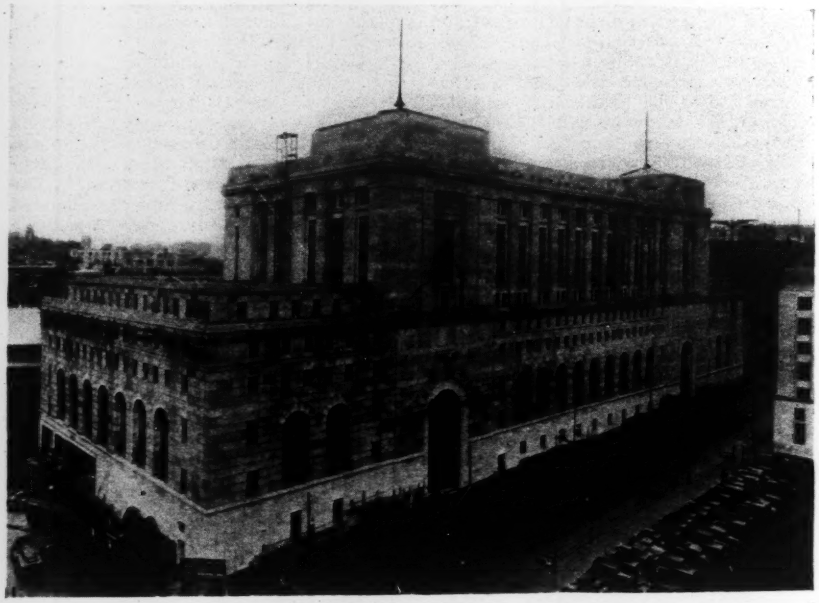
Philadelphia Subways—The principal subway construction in Philadelphia at present is confined to completion of the Market St. concourse line underneath City Hall. This work will straighten out the Market St. line, eliminating the present loops around City Hall. Complicated underpinning of the historical structure is involved in this work. The Locust St. extension has been completed as far as South Broad St. except for installation of equipment. The South Broad St. line has also been extended for three stations but is awaiting the installation of equipment before it can be used. The Market St. combined bridge and subway structure across Schuylkill River was placed in operation last year for vehicular traffic, but no connection has been made between the elevated and subway structures on the west side of the river. Until such a connection is made, subway trains cannot use the subway structure. Permanent street paving over recently built subway lines, estimated to cost $500,000, is awaiting funds. The proposed rapid-transit line over the Philadelphia-Camden bridge will require a short subway connection at Eighth St. This line will operate through the new Locust St. line to South Broad St.

◆

New York Subways—During the year 1933 additional sections of the Independent Subway System were put into service, thus extending operation to 205th St. in the Borough of Bronx, to Roosevelt Ave. (Jackson Heights) in Queens, and to Nassau Ave. and to Church Ave. in Brooklyn, a total of 34 route miles and 110 miles of track. The city of New York now is carrying on negotiations with the PWA for a loan of $23,000,000 to complete the remaining sections (except the projected 6th Ave. line) that are now complete except for station finish, some track and operating equipment. This includes 18 route miles and 60 miles of track.

Dotsero Cutoff—Grading on the 38-mile Dotsero Cutoff connecting the Denver & Salt Lake R.R. west of the Moffat Tunnel with the D.&R. G.W. R.R. was completed in November, 1933, and at the end of the year 25 miles of track had been laid easterly from Dotsero. All rail and fastenings have been delivered; the ties come from the treating plant as tracklaying progresses. Gravel ballast for the first raise was completed Jan. 6, and contract for the final raise has been awarded. Concrete lining for the lower 1,084-ft tunnel was completed in November, 1933, and is in progress in the upper 600-ft. tunnel. The Eagle River Bridge was completed in January, 1933, and concrete piers and abutments for nine Colorado River bridges were completed in November last year. All steel has been delivered. Four bridges were erected in 1933, and falsework for three others was in place in January. Pile trestles are driven as tracklaying progress. The Dotsero station is built.

Pittsburgh Federal Building—New Post-office facilities will occupy the first four floors and basement of the new federal building in Pittsburgh, Pa., while federal courts will be accommodated in the upper six stories. In plan dimensions the building is 532 ft. long, 146 ft. wide on one end and 196 ft. wide on the other. The building contains four railroad sidings at street level, providing 2,000 ft. of trackage carried on the building frame and isolated by a cork mat. A structural innovation in the building is the use of some forty heavy girders of the split-I-beam-flange type to support tracks, column transfers and a trucking ramp. Mail-handling facilities, including trucking docks, are housed in the basement of the building.



Buildings and Miscellaneous

Federal Buildings, Washington—All projects in the federal government's building program in Washington that have been appropriated for by Congress are nearing completion. Although authorized, no appropriation has been made for the $3,000,000 Apex Building nor for refacing the State, War & Navy Building. Including these buildings, the plan represents an expenditure of $101,000,000. Without further specific appropriations, the Apex Building, the exterior alteration of the S.W.&N. Building, new structures for the War and Navy Departments, additions to the Bureau of Engraving & Printing, and the Grand Plaza can be undertaken only if included by the PWA in its program.

Ridge Route Relocation—Relocation of Ridge Route in the Tehachapi Mountains north of Los Angeles, Calif., a $3,000,000 undertaking was completed during the year. The work has been under way since 1930. Construction of 26 miles of modern highway was involved, making a saving of 9.6 miles over the old route.

◆

Army Housing—With PWA allotments totaling $61,000,000 for army housing, $34,000,000 was under contract Feb. 1, 1934, and another $24,000,000 was obligated in work advertised for contract or under way on force account. Extensive housing projects are going forward at West Point, Fort Benning, Fort Humphreys, Fort Bragg, Fort Sill, Fort Meade, Fort Sam Houston and practically all of the Air Corps posts.

◆

Rockefeller Center, New York—During the year the 69-story R.C.A. building, the central unit in this great three-block-square development, was completed, as were the twin six-story British and French Buildings on Fifth Ave. In September excavation began on the unoccupied east half of the north block, about 113,000 sq.ft. in area, in preparation for the two nine-story buildings on Fifth Ave. and later for a 38-story and a nine-story building west of these.

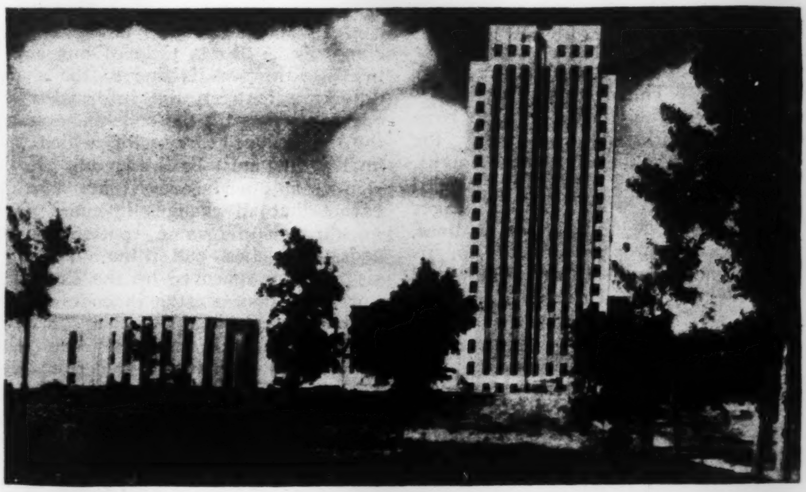
◆

Market St. Widening, St. Louis—As it is now in full service, the Market St. widening in St. Louis connects the south side of the business district between Third and Twelfth Sts. with the Union Station and with the mid-town district through its connection to Vandeventer Ave. (38th St.). A 3-mile extension to the western city limits by an express highway without intersections at grade is now being considered.

◆

Jones Beach State Park, N. Y.—The new Meadowbrook Causeway approach to Jones Beach State Park on Long Island, made possible by a $5,000,000 RFC loan, was begun in April, 1933. Comprising a 5-mile causeway connecting Meadowbrook State Park on the mainland with the west end of Jones Beach, and a spur connecting the causeway with Long Beach to the west, the principal contract requires 10,000,000 cu.yd. of sand dredging, to build up an embankment across Great South Bay. The project will be completed in 1935.

North Dakota Capitol—A $2,000,000 skycraper capitol of modern design has been built by the state of North Dakota at Bismarck to replace the building destroyed by fire in 1930.



Long Island Parkways — Northern State Parkway, known as Grand Central Parkway within Queens Borough, was opened for a distance of 12 miles east from Kew Gardens, the point where the parkway forks, one line going northwest to the Triborough Bridge, the other, known as the Interborough Parkway, going southwest to Brooklyn. All contracts have been awarded on the latter, which requires eighteen grade-separation structures. The first contracts on the Grand Central Parkway Extension to the Triborough Bridge approach have been awarded. The Interborough Parkway is scheduled for completion within 18 months, and the Grand Central Parkway within two years.

◆

Boston Vehicle Tunnel—Major construction work on the vehicle tunnel between Boston and East Boston has been completed, including the tunnel under the river, the two ventilation buildings, one on each side of the harbor, and the ventilation system. Work is now under way on the installation of cables for power, lights and signals, the glazed tile lining on the walls of the tunnel, the toll-booth equipment and street widenings for the Boston approach. It is expected that the tunnel will be ready for traffic about May 1, 1934, 37 months after start of work.

◆

Midtown Hudson Tunnel, New York—A loan of $37,500,000 to the Port of New York Authority for construction of one tube of a projected twin-tube vehicle tunnel under the Hudson River in the neighborhood of 38th St., Manhattan, was approved by the PWA on Aug. 30. Contract for the cast-iron lining was let within a month, and contracts for lining bolts and lesser work were let subsequently. Bids on the under-river portion of the tunnel are to be opened Feb. 6. Contracts for this latter work will require that it be complete by March 1, 1937.

Codifying Industry Under the Recovery Act

Eight months of activity finds 246 codes approved, 320 in the hearing stage and 300 waiting for a hearing, a backlog large enough to bring problems of administration and revision into prominence

By Wallace Thompson

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LONG BEFORE the National Industrial Recovery Act was dreamed of, before industry itself thought that its fantastic prosperity would ever need the doctor of government codification, or labor that such a thing could be, the idea of NRA was born. Herbert Hoover, in days that now seem legendary, used to call industry into council at Washington, used to urge the strengthening of trade associations and led discussions as to how the Federal Trade Commision might be modernized so as to aid as well as hinder business. And for a year before President Roosevelt took office last March, when industry was sick and labor stifled, suggestions had arisen in many quarters that a way be found to suspend the operation of the anti-trust laws, so that industry might work together to clean its own house, even though such suspension be for only a few months.

It helps to bring realization of how far we have actually come to remember the chaos of a year ago, in industry as well as in business and finance. Industry had been squeezed down, against its own wall and between its rivals. The sweatshop had reached proportions unbelievable in this modern age, for with cut-throat competition the only place where the slack could be taken up was in wages, and labor was paying for reduced prices; with its reduced incomes it could not buy; the vicious circle was closing in.

The relief program

The relief program contemplated at first a public-works program. Industry was to be allowed to work its way out, apparently, on the wings of the upward surge of reviving business. In the early stage of the recovery plans, NRA was vague, if considered at all. The pressure, however, for relief to industry was tremendous, and the National Industrial Recovery Act as passed by Congress and signed by the President on June 16 embraced both ideas, the industrial recovery program as "Title 1" and the public works program as "Title 2." In the industrial section were the provisions by which industry was to write its own codes, was to have freedom from the anti-trust laws in so far as the codes set up other safeguards against monopoly and the oppression of small industries, while it was to pay for its privileges by employing labor at wages sufficient to furnish "a decent living" and by agreeing to meet its employees in collective bargaining with "representatives of their own choosing." In the public works section the vast sum of $3,300,000,000 was set aside to carry on government works, roads, rehabilitation of the navy, and to furnish a portion of the funds normally spent for service facilities by states and municipalities and to loan money for productive private works.

Early organization changes

For some reason which history will doubtless reveal in its own good time, the NIRA, designed as a unit, with complementing sections of industrial reform and recovery through public-works expenditure, was split in two. Hugh S. Johnson, first scheduled to head the whole enterprise, was given the code work alone, and Secretary of the Interior Ickes was made Administrator of Public Works. For convenience the two divisions were designated NRA and PWA. The original plan, it becomes increasingly clear, was to have the public-works program carry the country through the first tough months, by pouring out its wealth into needed projects which would scatter wages widely, while, behind the battle lines, NRA was to prepare industry for its job of handling itself on a new and more widely social plane. But the PWA was delayed because its allotments were so carefully scrutinized that no breath of scandal ever has or probably ever will touch it, a magnificent moral achievement. While this cautious work went on, NRA was driven by forces greater than itself to turn into a recovery program, when it was not a recovery program and never could be.

With the support of PWA lagging, NRA had to bring about its own rescue. General Johnson devised the "President's Re-employment Agreement" and the Blue Eagle, its symbol. Under this plan, employers of labor throughout the country pledged themselves individually to employ more people, to pay improved wages and to work limited hours, in a common effort to put more people back to work. The response is history, one of the fantastic stories of the depression, for it did achieve its ends, did put hundreds of thousands back to work, did increase pay for those and other hundreds of thousands. The PRA continues, extended beyond Dec. 31, when it was scheduled to end by the simple device of allowing Blue Eagles to be kept by those who have the new NRA codes and by those others who voluntarily wish to continue their cooperation. It is to last until the end of April.

Code development

A code is a body of law, and that is exactly what the NRA codes set out to be. Under the NIRA, codes are enforceable as law, and moreover as criminal law, for violators may be fined and imprisoned. The codes are drawn with a certain informality of purpose and content, but the process is rigidly circumscribed. Not a little of our impatience with them is due to the sharp difference between the informality of our relations with the code-makers and the meticulous care with which the final drafts must be drawn up. Revision of approved codes is not difficult, except that all changes in codes must go through the same routine as the codes themselves, and in the final analysis must be approved by the President (or the Administrator in codes of industries employing less than 50,000). In their essence the codes are self-government of industry, and this right guaranteed under the Recovery Act is sometimes more jealously guarded by NRA than by the industries themselves. For the industries, in their need, have more often than most outsiders know come begging NRA to take over their industrial relations, their competitive situation, almost their businesses, and run them. But now the story has been written, the codes drawn for the vast majority of the industries, the codemakers of NRA are appraising the job, and with most of the important codes in hand (246 approved, 320 more with hearings completed, possibly 300 more to be heard, counting the food-industries codes just brought over from AAA) are directing part of their effort to clear up confusions, uncertainties, conflicts.

There are now seven grand divisions of the industries, with six divisional administrators, 21 deputies and 1,500 employees. General Johnson still rules as Administrator, his organization having been changed astonishingly little since he first envisioned it in June of 1933.

The codes have kinks in them—none knows better than NRA—but these were consciously left in the drive to get the codes through on a mass-production basis, in preference to stopping to work out a laboratory specimen to serve as a model.

The remaining unsettled provisions are relatively few—but serious. One is the question of price fixing, price control. Another is wages, with organized labor fighting doggedly for fixed scales for different types of labor in each industry, rather than the minimum for unskilled workers alone provided in the law. A third is code jurisdictional conflicts.

Price fixing

Price fixing has been—and still is—one of the major unsolved issues at NRA.

The "open price association" idea was regarded at first at NRA as a panacea, but it has not worked perfectly, especially in the case of industries with a few producing units, with standard products where, as in the steel industry, the price (in one case of steel rails) was absolutely fixed for all producers by the open-price announcement of one dominating producer.

The question of hours of work in American industry is still a tremendous issue at NRA. If labor gets the same wage for the shorter week as is now paid under the codes for the longer work week, a reduction of working hours will increase costs and then prices, quite outside the plans of the government. It will be a different kind of price increase, and the farmer will protest—very loudly—for it will come out of the white-collar class, and out of the very coherent farmer group.

Wage rates for skilled labor

The issue of varying scales of wages for the differently skilled types of labor within each industry is still an unsolved problem. NRA attorneys have firmly stated that this is not the intent of the law, which specifically provides that minimum wages only shall be fixed in the codes, but labor is not through. The construction code was long held up by the President pending a settlement of that contention, for union labor took the issue direct to the White House after it had been overruled in NRA.

Inter-industry difficulties

Inter-industry conflicts under the codes have begun to stir some trouble at NRA. The most irreconcilable is in the fuel and energy field, and to this end NRA has proposed to make a fuel and energy survey, with its first job the question of inter-industry competition. How sound this plan will appear to the economists and to business generally remains to be seen.

There remains also the problem of correlating the codes and their provisions. Principles have never been set down, officially, in any field, and policy remains as nebulous in most cases as it has been for the past seven months. No industry can be sure that any provision will be acceptable just because another industry got it, although it makes an impressive argument.

Administrative machinery

The machinery of NRA remains, after seven months, much the same machinery as General Johnson envisioned and set up last summer. The deputies are the contacts with industry; above them, in their several groups, sit the divisional administrators (the one recent addition), while in the process of code-making the industrial, labor and consumer advisory boards furnish their representatives, take an active part in the studies, the hearings and the deliberations. The legal division, well organized, has steered the ship of NIRA through seas and around rocks that are even yet threatening. The economic division has furnished mountains of studies, temporary or permanent in their scope, and it continues that job. And yet with it all, it is a new machine, doing unheard-of things, but driving on toward codification and now toward the enforcement of codes with relentless precision.

Of the advisory groups the industrial is the best organized, and its code advisers and the direct advice of its members to General Johnson have been a tower of strength in the struggle to get the codes through, to make them work and to make them truly representative of often incoherent industries. The labor board has done its job grimly and well. It has conceived its function as not merely to get all it could (there has been plenty of that) but also to cooperate, and to make industry glad that it is sitting down with labor at the big "partnership table" that President Roosevelt referred to in his approval of the law. The consumer's board has not been so effective, but it has made itself heard, to say the least, and it has produced piles of charts, while fighting definitely to see that no more than the actually authorized increases in costs are passed on to the consumer in prices. It has a place of use, which will increase during the compliance period into which NRA is now entering.

The compliance plans are only now finished and being circulated to the officers who are to carry them out. These officers consist of two groups, the code authorities and the state directors of compliance recently appointed as paid officials under the National Emergency Council. The code authorities, named by the industries, each have one administration member who wields the veto power over decisions of the authority, if the Administrator instructs him to wield that veto power; it is the safeguard against monopolistic practices and other violations of the anti-trust laws which are not legally set aside by the NIRA and the code. The code authority handles all complaints as to trade-practice violations, and, if it has set up a labor subcommittee with full labor representation, it may handle minor labor complaints. Major labor problems, including matters that threaten to lead to strikes and violations of the collective bargaining clauses of the NIRA, go direct to the National Labor Board, set up last August to handle just this type of problem; the board has eighteen regional offices where complaints may be filed. The state directors handle problems coming up in code compliance where the code authority is not authorized to handle them in the first instance. Above both are the National Director of Compliance and the Compliance Board, and when each of these bodies has in turn failed to achieve the clearing up of a complaint by adjustment and arbitration, the matter goes to the Federal Trade Commission for strict investigation, or to the Attorney General for prosecution.

Future of the plan

None know how well the plan will work, how safely the self-government of industry will be maintained, but of this we can all be sure: There is a deep and sincere desire to maintain that independence and self-government. It will not be wrecked, under the present NRA, except by serious violations from industry itself. Labor is having its day and will continue to have it, but it is a blind man indeed who could not foresee that that day would come, and in the present relationship with industry, labor is gaining its ground in ways that should certainly benefit employer and employee alike.

The Recovery Act is a labor law, as NRA officials have repeatedly stated and as Congress has indicated, yet it is far more than that. In the spirit of self-government for industry with strong safeguards for labor, there should be reason enough for sound faith in its ability to meet, as they come, its myriad and tremendous problems.

Six Months' Struggle for a Construction Code

The work of unification under an NRA code had to overcome extraordinary difficulties, but its successful accomplishment provides an effective mechanism of industry self-government

BY JAMES W. FOLLIN

Secretary, Construction Industry Code Committee, Construction League of the United States, Washington, D. C.

THE YEAR 1934 marks an important milestone in the history of construction. It signifies the beginning of industry self-government and the initiation of a new era in construction activities. After years of effort to unify the construction industry and to marshal its forces for effective cooperative action, the goal has at last been reached in the approval on Jan. 31, 1934, of the Code of Fair Competition of the Construction Industry under the National Industrial Recovery Act.

However, the real job is only now beginning. The code is merely the constitution for the industry. Its administration will be more difficult than that of any other industry under NRA—excepting possibly the retail code.

In normal times construction employs 2,500,000 workers, and there are more than 150,000 employers competing for a volume of business that varies from five billion to ten billion dollars a year. But construction is a dispersed and itinerant industry; its units establish headquarters wherever work is to be had, employ labor of all types and descriptions, and when the job is completed pull up stakes and move on. Regulation of fair trade practices in such an industry, and the enforcement of wage and hour provisions to insure fair competition among employers and fair treatment of labor are obviously problems of the first magnitude. Clearly, if the code is to accomplish the many reforms anticipated, the industry must throw itself into the work of administration with the same energy and determination that marked the early weeks of code drafting and negotiation.

An achievement of cooperation

The accomplishment of the construction code is a remarkable record of unselfish cooperation by the national associations that form the Construction League or cooperate with it through the advisory council of the League's code committee. It brings to fruition efforts that were begun in 1931 with the formation of the League to unify the construction industry and to eliminate, through cooperative action, the unsound business practices that were all but disrupting this gigantic industry. Some of the industry's trade practices were unacceptable even during the affluent years of prosperity, but since that period matters have gone from bad to worse until "chiseling" has become the accepted practice and those who do not employ it are automatically ruled out of competition. In this dog-eat-dog process either the purchaser of construction loses, or else the losses must be taken from those furnishing materials and labor. These are the conditions which the code seeks to correct.

Unification Voluntary—The industry has unified itself under one code willingly and without coercion. The National Industrial Recovery Act does not empower NRA to compel grouping of related industries under a code, nor did the League attempt to coerce these divisions into a unified code. It is, therefore, all the more remarkable that the many divisions of construction, which so long failed to achieve common action on industry problems, should within a brief period of a few months be joined in a code empowering each division to regulate the actions of its member firms, but yet establishing a tribunal to settle conflicts between two or more divisions.

Initially, it is true, some of the divisional groups filed independent codes with NRA, and several were not enthusiastic about coordinating their efforts with the other groups. But the policy of open and frank discussion and fair dealing completely disarmed any suspicion of ulterior motive and resulted in acceptance of the unified code by all.

Only One Construction Code—Even the form of the code is helpful to industry solidarity. Code-writing last August began with a "basic code" submitted by the League, tying together a dozen or more supplemental codes for different divisions of the industry, each of which was complete in itself and might readily have been detached from the whole at a later date. But subsequently all these partial codes were rewritten into one code, the first chapter of which, corresponding to the old basic code, contains the general provisions and sets up the over-all Construction Code Authority, while each subsequent chapter sets up its divisional code authority, and prescribes the trade practices peculiar to the particular division of the industry, with any exceptions to the wage and hour provisions of Chapter I. Thus, the members of a division are governed jointly by Chapter I and their specific chapter, the two being inseparable, since the divisional chapter would be inadequate for regulation if disassociated from Chapter I.

A six months' campaign

Now that the construction code is an accomplished fact, it is instructive to restate the various steps that have marked the code-making. About the middle of July, 1933, leaders in the construction industry and in the NRA agreed upon the desirability of coordinating all codes for construction through a basic code. On July 26 the policy committee of the Construction League officially accepted the responsibility of sponsoring such a basic code and appointed a code committee with Stephen F. Voorhees, architect, as chairman. On July 31 this committee presented the initial draft of the basic code to an advisory council, and with its endorsement submitted it to NRA on Aug. 7. Starting Sept. 6, the basic code and nine supplemental codes were heard at public hearing, while others were heard at later dates.

Late in October, when action was lagging on determination and approval of the codes, a special committee of the League conducted a promotional and publicity program to secure action. This resulted in the reconvening of public hearing on the code, on Nov. 20, a very unusual procedure in code-drafting. While this reconvened hearing did not result in pacifying all opposition to the code, it did definitely confirm the competence of the League and its allied groups as representatives of the industry. There still remained a demand for a separate building construction code and for a modification of wage and hour provision.

The Conference Committee—At the conclusion of the Nov. 20 meeting Administrator Hugh S. Johnson appointed a conference committee of industry, labor and NRA representatives, generally referred to as the Richberg committee, since the general counsel of NRA, Donald R. Richberg, took the leadership in attempting to straighten out the conflicts and disagreements. From the conference committee there emerged the chapter form of unified code and complete agreement within the industry as to the content of the code and the constituency of the Code Authority. But the labor representatives who sat on the conference committee did not approve this draft. In spite of labor's disapproval, Chapter I and supplementary chapters for eight divisions of the industry were approved by the Administrator on Dec. 22 and sent to the President.

The President takes a hand

Many Congressional problems prevented the President from giving immediate consideration to the code, but in due course he heard labor's plea for reconsideration of certain labor provisions and returned the code to NRA for further study.

The most important development of the last week of conferences, which brought about concurrence in the construction code, was the incorporation in the approved code of the proposal by the Divisional Administrator to whom the code had been referred on its return from the White House for a National Construction Planning and Adjustment Board. This board is composed of ten employer and ten employee representatives and an impartial chairman. It is charged with the planning and development of policies that will promote better relations between employers and employees and the furtherance of other matters of their mutual interest. It has no original jurisdiction, but *by consent of all parties in interest*, differences relating to wages, hours of employment and working conditions may be submitted to it.

The Planning and Adjustment Board is specifically defined in the code as the body to which parties in interest must make application for increasing or decreasing the 40-hour maximum work week. It is regarded by executives of NRA as offering what is possibly the best approach yet found to an amicable solution of labor disputes. At the time of signing the executive order which put the construction code into effect, President Roosevelt addressed a letter to General Johnson, suggesting that one of the first duties of the Planning and Adjusting Board be that of making a thorough study of trade jurisdictional disputes, a problem that has long distressed the industry.

Chapter I of the code thus is in full effect. As this is being written, Chapter II, covering general contractors, is awaiting the President's signature. Other chapters for further divisions will follow.

For the content of the code a fuller report may be referred to [see p. 209 of this issue.—Ed.], and the general analysis given in two articles by S. F. Voorhees and the present writer three months ago (*ENR*, Oct. 26, 1933, p. 492) will be found illuminating. But it is worth special emphasis that in the code as finally approved the Construction Code Authority is empowered to appoint a Construction Appeals Board of balanced constituency (one architect, one engineer, three general contractors, four special contractors) to hear appeals emanating from the decisions of the various divisional code authorities, and to determine (subject to appeal to the Administrator) conflicts between the provisions of the various chapters. These duties are of the very highest significance in that they propose to settle the many complaints and conflicts within the industry.

The fundamental principle underlying the construction code is maximum autonomy for each functional division of the industry under coordination of the Construction Code Authority, or industry tribunal, in which each division has representation. Accordingly, enforcement of the code within each division is directly by the Divisional Code Authority. Again, thorough-going administration within any trade division depends upon the delegation of code enforcement authority to regional or local agencies who are on the ground.

Fair Trade Practices—As to the vital matter of sound trade practices, Chapter I establishes rules for competitive bidding in all divisions of the industry, with the requirement that this be enforced by each division through satisfactory methods for checking bids either by designating a depository for the filing of duplicate bids or some other acceptable method. Bid peddling and bid shopping, which have almost disrupted the industry, are condemned and prohibited; "an unnecessary number of bids" is discouraged, prequalification of bidders is required, and various regulations are included to prohibit collusion, rebates and other bad practices.

Labor problems

Labor objected to the Construction Code for one thing because it combined under a single coordinating code authority not only building construction activities (with which labor is most concerned at present) but also heavy construction, operated generally upon an open labor basis. However, the code is predicated neither on the closed shop nor the open shop. It leaves to the individual division of the industry the task of making wage and hour agreements, so strongly emphasized in the Recovery Act. And this is essential since construction is not divisible except into functional streams involving such separate groups as architects, engineers, general contractors, and various types of special or subcontractors.

A second labor objection was to the omission of labor representation in the membership of the Construction Code Authority. But code authorities deal primarily with the enforcement of industry practices. The code gives labor equal representation on the special compliance boards established where mutual agreements are in force. Equal representation is given as well on the Construction Planning and Adjustment Board and its regional sub-boards.

Skilled labor rates

From the beginning labor has contended for writing PWA skilled-labor rates into the code as a minimum, to serve as a base from which regional or local collective bargaining would begin. The code committee was not opposed to the fixing of skilled-labor rates in the construction code, but felt that such rates are not a proper subject for inclusion in the general provisions of Chapter I, inasmuch as it would be practically impossible to define completely and clearly all the various classifications. The subject is also surrounded with many legal technicalities.

The National Recovery Administration, on the other hand, has proceeded on the policy that the NIRA contemplates the fixing of minimum wage rates only for the lowest-paid workers, or those at the subsistence level, whose actual existence depends upon such a minimum rate and whose labor should not be exploited. Skilled-labor rates were deemed acceptable in a code binding every employer in the nation only when based on *bona fide* collective bargaining from so highly representative groups of employers and employees that there could be no flareback or probability of legal action to upset the rates.

Some twenty divisional chapters are now under consideration. Possibly there will be some combining of the chapters as submitted. The chapter for general contractors includes subdivisions for building contractors, highway contractors, and heavy engineering and railroad contractors, each of which is empowered to administer the code within its respective field. Chapters have not yet been proposed by several recognized fields of special contracting, and it will be some months before the content of the code is complete.

Opposition to the construction code, fortunately, has resulted in knitting together the various cooperating associations more tightly in the common purpose than even the most optimistic had imagined would be possible. Accordingly, there is now complete industry solidarity ready to tackle the difficult and arduous task of establishing adequate industry self-government, nationally, regionally and locally. Each division of the industry must undertake immediately to inform its employers of the content of the code, organize administrative committees and agencies, and otherwise prepare for the basic reconstruction and change which the codes will ordain.

As Labor Views the Code

Broad-gage provisions for cooperation make possible a stabilization of construction that will benefit employer and wage-earner alike and contribute to national recovery

BY WILLIAM GREEN

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THE CONSTRUCTION INDUSTRY has finally accepted the challenge of the New Deal. On Jan. 31, the Construction Code was approved by President Roosevelt, to become effective on March 2, 1934. After months of bitter controversy, the demands of management and organized labor have been reconciled, and a sound plan for the restoration of one of our greatest industries has been established. In formulating this code, the Administration has conformed more closely than in any other instance to the basic purposes of the Recovery Act.

Under this master code, the industry is now organized for real self-government and self-regulation under federal supervision. The responsibility for this self-regulation rests with the Code Authority and Divisional Code Authorities similarly constituted of employers, architects and engineers. Having thus established the rights of management, the code gives full recognition to the fundamental purpose of the Recovery Act: "To induce and maintain united action of labor and management under adequate governmental sanctions and supervision." This is accomplished through provision for mutual agreements and for equal representation on the National Construction Planning and Adjustment Board, as well as on similar regional boards.

It is significant that this principle is put into practice after seven months of experience in industrial codification and administration. The real need for closer cooperation between organized labor and organized management has been amply demonstrated during these months. Had this need been squarely met by the Administration at the outset, much of the recent industrial unrest would have been avoided. Organized labor will demonstrate this contention when the Construction Code is put into operation.

Labor agreements

In the provision relating to mutual agreements, it is stated that in each division and subdivision of the construction industry truly representative associations or groups of employers and employees concerned, as a result of bona fide collective bargaining, may establish by mutual agreement for a specified area the standards of hours of labor, rates of pay and other conditions of employment relating to occupations or types of operations. The provisions of any such agreement, when approved by the President, will become a part of the code. Special boards consisting of one representative of employers and one of labor, under an impartial chairman, will supervise and investigate the enforcement of these mutual agreements.

Planning and adjustment boards

By the terms of the code the National Construction Planning and Adjustment Board is given the authority to "seek cooperation of all factors involved in the stabilization and promotion of the well-being of both employers and employees in the industry." It is also designed for conciliation or voluntary arbitration of all disputes relating to wages, hours and working conditions.

With ten representatives of employers and ten representatives of labor, selected respectively by the Industrial and Labor Advisory Boards of the NRA, and under the chairmanship of a disinterested party to be appointed by the President, this planning adjustment agency seems to be excellently conceived for settlement of all labor disagreements.

Hours and wages

The code provides for a 40-hour week, five-day week and an eight-hour day to apply to those cases where the hours of work are not governed by a mutual agreement. Even under this limitation there is a danger that there will be insistence on a 40-hour week in construction. It is important to point out, therefore, that under the present plan of industrial stabilization, the construction industry is given an unprecedented opportunity of reducing the hours of work. A wage-earner in manufacturing, employed throughout the entire year on a 30-hour week, will total more hours than a building mechanic can possibly total on a 48-hour week. In actual fact, during the depression years the fully employed construction worker has been earning a living only over a small fraction of the year. An average of more than two-thirds of the total union membership in the industry has been out of work throughout 1933.

This disastrous plight of the construction worker must be remedied. It will be possible to reduce greatly the irregularities of employment when the industry benefits from stabilization under the present code. But effective increase in employment can be accomplished only by the adoption of a work week substantially shorter than the one provided in the code at present.

Similar considerations apply to the minimum wage provisions of the code governing the minimum rates of pay received by workers not covered by agreements. It is hoped that in the course of the code administration the construction industry will substantially raise the 40c. minimum rate and thus enable the worker to meet the rising cost of living. The payroll estimates made by the American Federation of Labor show that the buying power of the building construction workers in 1933 was only one-sixth of their buying power in 1929.

Eliminating wasteful competition

There is no question but that the largest portion of waste in the industry has been chargeable to the practice of competitive bidding. Much of the financial burden resulting from this waste has been borne by the worker. By outlawing bid peddling and bid shopping the code will put an end to this disastrous drain upon the resources of the industry. It should result not only in the betterment of the worker's income but also in regularization of employment.

Prospects

The construction industry, second only to agriculture in national economic importance, has gone through a period of violent sickness. This industry, on whose activities one-tenth of American wage-earners directly depend, touched its low point a year ago. It now shows unmistakable signs of recovery.

After a spontaneous upturn in private building, construction is being further stimulated by the federal public-works program. Anticipating continued increases in public and private building, organized labor is confident that under its new constitution the construction industry will fully share with the wage-earner in the benefits of this revival. Only in this way can the construction industry fulfill its duty of giving its full share of participation in recovery.

Employment and Payrolls

An analysis of the statistics of industrial employment during the last ten months of 1933

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IN CONSIDERING the effects of the recovery program upon employment, the period from March, 1933, when the first step in recovery was put into effect, to December, 1933, the last month for which complete data are available, conveniently divides itself into two parts. The first is the seven months—March to October—when each successive month saw a rise in the aggregate employment and payrolls of American industry. The second is the two months—November and December—when, although the index for industry as a whole declined, certain industries, basic to recovery, showed appreciable gains.

In March our manufacturing industries had reached their ebb. Forty-five out of every 100 persons who had been employed in our factories in 1926 had been laid off. In the iron and steel group, employment had shrunk by one-half; in the production of machinery, by 57 per cent; in the lumber and allied products group, by 68 per cent; in stone, clay and glass products manufacture, by 63 per cent. Moreover, within these industrial groups the employment conditions of certain individual industries had reached the stage where hardly any one was at work. In the locomotive shops of the country, nine out of every ten workers employed in 1926 were no longer on the payroll; in cement production, eight, and in machine tools, seven out of every ten.

Similarly, the amounts paid out in wages by the manufacturing industries had declined to almost unbelievable depths. Payrolls in March, 1933, were exactly one-third of the weekly average for 1926. The payroll of the iron and steel and machinery industries had fallen to slightly more than one-fifth of what it had previously been. In lumber and wood products it was down to 14c. for every dollar paid out seven years previously; in the building materials industries it had fallen to 20c.; in the production of locomotives, it had dropped to 6½c.; and in brick and tile manufacturing, to slightly more than 7c.

Between March and October the index of employment in the manufacturing industries rose from 55.1 to 75. This gain, it is estimated, represented a net addition of 1,780,000 to our factory labor force. In this same period the payroll index advanced from 33.4 to 53.6, representing a rise of approximately $44,600,000 per week.

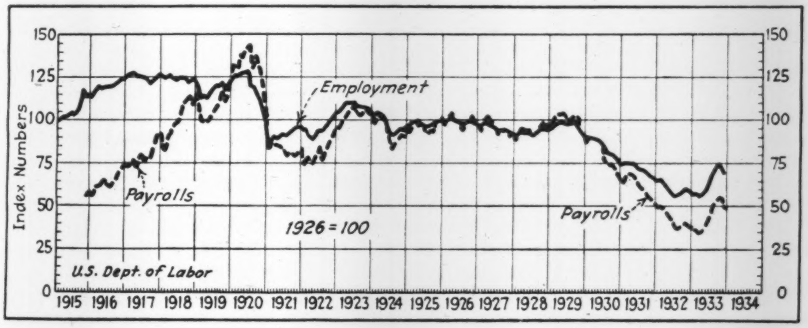
The most marked gains occurred in the consumption goods industries. The so-called durable or production goods industries, however, although showing perceptible gains, did not reflect this same degree of recovery, as shown in the accompanying table.

On a percentage basis, the gains in employment in the production goods industries were large. When viewed in relation to their position seven years ago, however, all of them had a considerable distance to go to approximate the level of 1926. Indeed, the only group that registered gains approaching those experienced in the consumption industries was chemicals.

Many of the declines in employment and payrolls that occurred after October were, of course, seasonal. Nevertheless, in November the factory index of employment dropped to 71.4 and in December there was a further fall to 70.1. Payrolls likewise fell.

Of the fourteen manufacturing groups into which the Bureau of Labor Statistics employment data are classified, transportation equipment was the only group that showed an increase in employment during the last two months of 1933. The index for this group rose from 56.9 in October to 58.7 in December. The rise was due to employment gains in the aircraft, automobile, locomotive, and ship-building industries. By and large, the declines in the durable goods industries were relatively smaller than those in the non-durable groups.

INDEXES OF EMPLOYMENT AND PAYROLLS in the manufacturing industries. (Prepared by the Bureau of Labor Statistics.)



EMPLOYMENT AND PAYROLLS IN THE DURABLE AND NON-DURABLE GOODS INDUSTRIES, MARCH AND OCTOBER, 1933
1926 = 100

Industrial Group	Employment		Payrolls	
	March	October	March	October
Consumption Goods				
Food and kindred products	76.4	103.7	58.1	81.7
Textiles and its products	67.5	87.9	39.0	67.7
Leather and its manufactures	75.8	84.1	45.5	62.0
Paper and printing	76.8	90.5	58.9	70.6
Tobacco manufactures	59.5	74.0	38.4	53.6
Production Goods				
Iron and steel and their products	49.1	73.2	22.5	47.3
Machinery	42.2	64.0	23.2	43.6
Non-ferrous metals	48.7	73.0	28.1	51.4
Transportation equipment	43.5	56.9	26.3	41.2
Railroad repair shops	47.0	51.0	34.8	44.7
Lumber and allied products	31.9	51.8	14.4	33.2
Clay, stone and glass products	37.1	51.7	20.7	32.8
Chemicals and their products	76.4	98.7	58.5	77.8
Rubber products	60.2	89.1	32.2	62.8

INDEXES OF FACTORY EMPLOYMENT AND PAYROLLS, MARCH-OCTOBER 1933
1926 = 100

Month	Employment	Payrolls
March	55.1	33.4
April	55.0	34.9
May	58.7	38.9
June	62.8	43.1
July	67.3	46.5
August	71.6	51.9
September	73.9	53.3
October	74.0	53.6

INDEXES OF FACTORY EMPLOYMENT AND PAYROLLS, OCTOBER-DECEMBER, 1933
1926 = 100

Month	Employment	Payrolls
October	74.0	53.6
November	71.4	50.3
December	70.1	49.8

However, an appreciable number of industries, important as indicators of future activity in the other industries, showed gains in employment during these two months in the face of the decline in manufacturing as a whole. Among them were iron and steel forgings, hardware, tools, agricultural implements, engines, turbines, machine tools, typewriters and supplies, lighting equipment, glass, chemicals and explosives.

The extent to which employment in the durable and consumption goods industries must be revived if it is to approach the levels of the pre-depression years is shown in the following table, in which is presented the estimated number of factory workers on the payrolls in November of 1929, 1932 and 1933.

	November 1929	November 1932	November 1933
Durable goods.....	4,207,900	2,082,900	2,654,200
Consumption goods	4,468,600	3,231,000	3,730,000

This shows that whereas the addition of but 738,100 persons, or 17 per cent, to the November, 1933, payrolls of the consumption goods industries would bring employment back to where it was in November, 1929, it will require an increase of 1,553,700, or 37 per cent, in the number on durable goods payrolls to reach the same level.

No authoritative data are available showing the status of employment in the construction industry. From scattered information it is estimated that the number of workers employed in construction which does not come within the category of PWA projects increased by about 44 per cent between March and December. Excluding clerical and supervisory workers, approximately 260,000 persons found employment in this same period on public-works projects. For the month of December the estimated monthly payroll on this work was $15,000,000.

Municipal Credit

An appraisal of the past year's developments which ranged from grave crisis, through federal help, to a substantial improvement in private financing

BY FREDERICK L. BIRD

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THAT American municipalities were facing a precarious and critical year was discouragngly evident at the opening of 1933. Curtailment and even abandonment of essential services and normal maintenance and construction work, menacing shrinkage of revenues in the face of rising costs for relief, budgets out of balance, payless pay days for city employees, accumulating arrears in commercial obligations, and a steadily widening list of defaults on debt were clear indications of an unfavorable trend that could not be ignored.

It appeared, moreover, in the earlier months of the year, that the direct forebodings of the prophets of disaster to local self-government might be realized, for unforeseen embarrassments arose to complicate an already perplexing situation.

Most ominous of these unanticipated developments was the widespread closing of banks and freezing of deposits following the national bank "holiday" in March. Public deposits were impounded, the normal sources of temporary borrowing for operating purposes disappeared in many places, and, of even more serious consequence, the already waning taxpaying capacity of whole communities was further depleted by the tying up of reserves. While generally this financial handicap was of temporary duration, in a considerable number of municipalities the total or partial collapse of the local banking system still continues as a major obstacle to rehabilitation. Here and there throughout the country local governments that had been struggling to make ends meet found this the final straw, and were forced to default on their debt obligations in order to avoid disintegration. The default of Detroit, though not unforeseen, was the most startling example; but scores of smaller places were forced into this unenviable position.

Effects of tax-limit legislation

Another contributing factor to municipal financial confusion was, strange as it may seem, the well-intentioned but sometimes poorly conceived efforts of general legislation to aid the oppressed taxpayer. Granted the need for greater diversification in the sources of municipal revenue, the shutting off of the main source without substitution of an alternative can hardly be considered a constructive step. Yet this is what happened in West Virginia, through a constitutional amendment and a series of court decisions. The mandatory lowering of the tax rate to a level that left little or nothing except for fixed charges reverberated in school closings, abandonment of maintenance, wholesale dismissals of officers essential to health and safety, and hectic maneuvering to salvage municipal affairs from complete chaos. A somewhat similar amendment in Ohio threatens disruption to the already unsteady municipal finances of that state unless the legislature rapidly produces satisfactory substitutes for the curtailment of the general property tax. Benevolently disposed legislatures and tax commissions in several other states have rushed to the rescue of the depressed taxpayer by provision for deferment of payments, waiving of penalties for delinquency, delaying of assessment and billing of taxes and kindred measures. The tax dodger, unfortunately, has shared these benefits with his impoverished compatriot, to the dismay of harried local officials already hard-pressed for operating funds.

Retrenchment, in fact, had arrived, belated in some cases, in certain others only mildly effective, but frequently ruthless and almost devastating in its effect. Heavy fixed charges and mounting emergency welfare costs forced a double burden of curtailment on services, maintenance and personnel. But the net result was a general lowering of taxes, most frequently in a range of from 10 to 20 per cent from peak levels, but as much as 30 per cent and even more in many places here and there throughout the country. Taxpayers, often irrationally, were for economy and more economy, regardless of the cost in the crippling of previously cherished institutions. Proposed bond issues, save for unemployment relief, received only the coldest consideration from electorates, and well into the year the prospects for municipal undertaking and financing of capital improvements were the lowest since the days of war-time inactivity.

Outlook now more favorable

Had there been a general continuance and complication of these trends toward the collapse of municipal credit, abandonment of maintenance and development of the physical prerequisites to urban health, safety and culture, and weakening of civic morale, the present outlook would indeed be discouraging. Fortunately, however, there are concrete indications that the tide has turned in municipal financial affairs and that the outlook is definitely more favorable than a year ago. Many municipalities, it is true, are submerged in financial difficulties from which it will take them years to extricate themselves, and many weak spots in our local governmental system will continue to come to light in 1934. With some 2,000 municipalities in default, there are bound still to be additions to the list. On the whole, however, there are sound grounds for encouragement.

Of most practical importance is the slackening in the rate of increase of tax delinquencies, a most dependable index in the direction of stability. In 1930 the median figure for tax delinquency for cities of over 50,000 population was 10.8 per cent. In 1931 the increase was relatively small, to 13.3 per cent; but in 1932 delinquency rose sharply to 20.1 per cent. In 1933 the rise continued, but at a less rapid rate, to 25.2 per cent. This record may appear lacking in positive encouragement, but detailed analysis reflects the contrary. There are numerous individual instances of a definite halt to the long and menacing increase in delinquency, accomplished by an upward trend during the past few months. In this change in trend the upturn in business, the lowering of taxes, the adoption of more vigorous collection methods and the widespread pay-your-taxes movement, fostered by a re-awakening of civic pride and responsibility, have had varyingly important rôles.

A series of specific developments, moreover, has contributed directly toward lowering the burden of municipal financial obligations and aiding the balancing of budgets. Of outstanding importance has been the frank recognition that unemployment relief in our industrial cities does not constitute an isolated, exclusively local problem, and the resulting assumption by the federal and state governments of the major portion of the load. Several states, furthermore, with good prospects of an increase in their number, have intervened to lighten the general property tax by direct or indirect assumption of a share in local school, highway and other costs. Finally, the stupendous conception of putting 4,000,000 people to work almost overnight, under the Civil Works Administration, brought its telling contribution in the closing weeks of the year in the unburdening of relief rolls and the rebuilding of taxpaying capacity.

Nor was the stimulating and courageous leadership of the New Deal without its profound psychological influence on local governmental affairs. Rationality, courage and a demand for action began to assert themselves. Realization that acute financial ailments have had their source in non-payment of taxes led to organized pressure against the unsocial tax striker and to more vigorous tax-collection methods. Marked and widespread improvement is taking place in financial policies and administration, with a noteworthy tendency to call in specialists for consultation as to ways and means of financial rehabilitation. And in the November elections better government was furthered in a number of cities by the ousting of long-entrenched political dynasties and the installation of public-minded officials pledged to financial and administrative reform. In New York City, indeed, the movement reached the proportions of a veritable revolution which promises a new day for that sadly misgoverned metropolis.

Cities and the PWA

In a year or so deviously critical for municipal finance, the factor which in many ways is the most outstandingly significant is the share of local government in the country's adventurous attempt to buy its way out of the depression through a huge program of public works. In June Congress appropriated $3,300,000,000 for this purpose, and by the close of the year practically all of this immense sum had been allocated for public construction purposes. Due to the unavoidable interval between the allocation of funds, the letting of contracts and the actual initiation of operations, the effect of this great undertaking on the economic life of the country is only beginning to be felt; but within a few months improvement projects will be under way in thousands of municipalities, large and small, in every section of the country.

Its influence, however, on municipal finance and financial policies for 1933 has been of far-reaching importance. Municipal construction of any magnitude had, following two sharply declining years, almost ceased in the early months of 1933, the low ebb of capital borrowing indicated little prospect of its early revival, and the sentiment of the public was strongly against the incurring of further obligations. Making annual payments on improvements purchased on the installment plan was proving to be something of a burden, and the selection had not always been judicious; so the public was on a buyer's strike and, of equal importance, credit had become vastly more difficult to obtain. Thus the legitimate improvement requirements of a growing country that was unevenly supplied with the structural essentials to civilized living were accumulating rapidly, as shown by the increase in adequate water systems, sanitary sewage-disposal systems, school facilities, institutional construction and the like, to say nothing of such almost untouched prerequisites to decent urban life as slum clearance, housing and rapid transit.

Public-works program slow to start

Local response to the opportunity for federal financing was slow at first, due partly to the lack of foresighted capital planning, partly to the rigid requirements of the Washington administrators, and partly to reluctance to incur further debt. Gaining momentum, however, as the full significance of the program became appreciated—opportunity to fight unemployment and at the same time secure needed public improvements at bargain rates—demands for grants and loans rolled in from literally thousands of communities. And in innumerable bond elections, culminating in November, the unanimity of public support, reversing as it did the earlier attitude toward capital projects, was little short of amazing.

Encouragement of municipal borrowing in a period of low municipal resources has been looked upon with skepticism by some authorities, and there are indeed grounds for argument that local governments, with their antiquated and undiversified revenue systems, are not equipped to bear the brunt of carrying out the public-works program—which, indeed, they have not been called upon to do. Aside from the major objective of the program, however, very specific advantages may be cited, among them the opportunity to secure with federal aid and at low interest cost capital improvements that could not long be deferred; the urge toward stabilization of financial position through the federal requirement of balanced budgets as prerequisite to the loans; and the tightening of financial standards through federal insistence on judicious and careful planning and federal checking to insure honest and economical construction work.

Private credit improves

One strikingly significant feature, as the year drew to a close, was the improvement in private credit facilities. In several outstanding instances, ably managed cities participating in the public-works program relied on the PWA for the grant only, and financed the remainder of their requirements through the normal channels at rates equal to or better than the federal government's 4 per cent. Hopeful in its indication that municipal credit still has fundamental strength, it is even more favorable for sounder public financing in the future in its intimation that large lenders are beginning to apply more discriminating and intelligent principles in the extension of such credit.

State and local borrowing for 1933 slightly exceeded a billion dollars, as compared with $936,000,000 in 1932 and a ten-year average through 1931 of roughly one and one-quarter billions annually. Of the 1933 total, $485,000,000 represented loans from the PWA and RFC and constituted the bulk of the borrowing for construction purposes, as most of the remainder was for relief, the refunding of maturing bonds and the funding of operating deficiencies. Thus federal aid fell materially short of taking up the slack and was primarily a pump-primer, as it has been called, toward a hoped-for more normal flow of both public and private construction in 1934.

Planning a Better Country

Out of the recovery plans has grown a program for guiding the development of physical, economic and social requirements, in which the federal government will cooperate with states and regional authorities

BY CHARLES W. ELIOT 2ND

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WHAT is National Planning? No two men, hearing that term for the first time, would probably interpret its meaning in the same way, yet the phrase is now in such common use that some further definition seems essential.

It is no new idea to have a state, or regional, or national plan in the United States. Indeed, we have had a series of such plans, starting, perhaps with "The New England Prospect" or Jefferson's "Notes on Virginia." The Constitution itself might be called a national plan, as might Hamilton's "American Manufactures" or Clay's "American System." In more recent times the city and regional planning movement has swept the country, involving the organization of more than 800 city planning and zoning commissions. In fact, planning of one sort or another has always been a part of the political scene in America.

Yet, despite this American background for planning, most people immediately associate a national plan with the Russian five-year plan, or with some scheme for a completely socialistic state or a type of autocratic control that may be quite as objectionable as "rugged individualism." Doubtless we may learn from the experience of other countries in the organization of planning work, but the efforts of the Roosevelt administration do not follow any foreign pattern.

Three forms of planning

National Planning in the "New Deal" is taking a variety of forms; in fact, so great a variety as to be quite confusing without careful analysis of the various elements and understanding as to how they fit together. Each group in the government and every individual citizen approaches the problem of a national plan from a different angle with a different background, and each interprets the movement largely in terms of that background.

Three major approaches to national planning are evident in the present activities in Washington, which may be roughly classified as physical, economic, and social or governmental planning. Work along any one of these approaches inevitably involves the other two almost from the beginning.

In the economic field a number of new planning agencies have come into being in the last few months, as, for instance, the Business Advisory and Planning Council of the Department of Commerce, and the Division of Research and Planning of the NRA. A central statistical board has been established to provide the basic statistical material for economic work. It is to these and similar planning groups that we now look to chart a course for industry over the waves of business cycles.

For social and governmental planning a wonderful background of data and inspiration was provided by President Hoover's committee on social trends. In many parts of the same field the New Deal has brought new methods and new interests in government procedure, with reorganization of bureas and new relationship between the executive and legislative branches and changes in the interpretation of the budget from a yearly to a period basis. The abolition of child labor, and the general acceptance of the principle of the minimum living wage have received new support and recognition through the NRA codes. The labor board of the NRA has opened the way to a new era in the relations between capital and labor.

In the third field—physical planning, based on the experience obtained in the city planning, zoning and metropolitan studies—planning work has also received new impetus and invigoration. From the point of view of those previously concerned with this kind of work, physical planning is now recognized as perhaps the most hopeful approach to the large-scale problems involved in the preparation of a national plan.

Recognizing the necessary interrelationship among these three groups of planning activities, a little over six months ago Secretary Ickes, as Administrator of Public Works, established the National Planning Board, which in its membership includes these three approaches to the planning problem. Dr. Wesley C. Mitchell, of the National Bureau of Economic Research, represents the economic approach and, through his previous work on "Recent Economic Changes" and on the committee of social trends, is obviously qualified to lead in economic planning. Dr. Charles E. Merriam, professor of political science at the University of Chicago, through his practical political experience and as vice-chairman of the committee on social trends, represents the social or governmental planning point of view. Finally, the chairman, Frederic A. Delano, who did so much to start the Chicago plan, carried through the New York plan and still heads the Washington plan organization, is the natural representative of the physical planning movement.

What the board does

This new National Planning Board is engaged in four types of work:

1. Advice on the public-works program.
2. Stimulation of city, state and regional planning.
3. Coordination of federal planning activities.
4. A research program looking toward the preparation of a "plan for a plan."

In advising the Administrator of Public Works as to the "comprehensive program of public works" contemplated under the Recovery Act, the board has devoted its attention to criteria for types of projects, geographic distribution of funds, and elements of timing, rather than to the details of any particular project. At the outset of the work, for instance, statements were included in the circulars on public works emphasizing that conformity to state and local plans would be given serious consideration by the Administrator in the choice of projects. Recognition of local planning efforts has been a primary motive in the program for stimulation of planning by states and cities.

The National Planning Board has endeavored to encourage local planning work in the belief that experience and satisfactory results in local planning are essential to public support of the planning movement as a whole. Recognition of planning work as a suitable activity under the Civil Works Administration, for instance, has resulted in a marked stimulation of planning effort in 86 cities, and the employment of over 5,000 engineers, draftsmen and other assistants on projects inducted by city and regional planning boards.

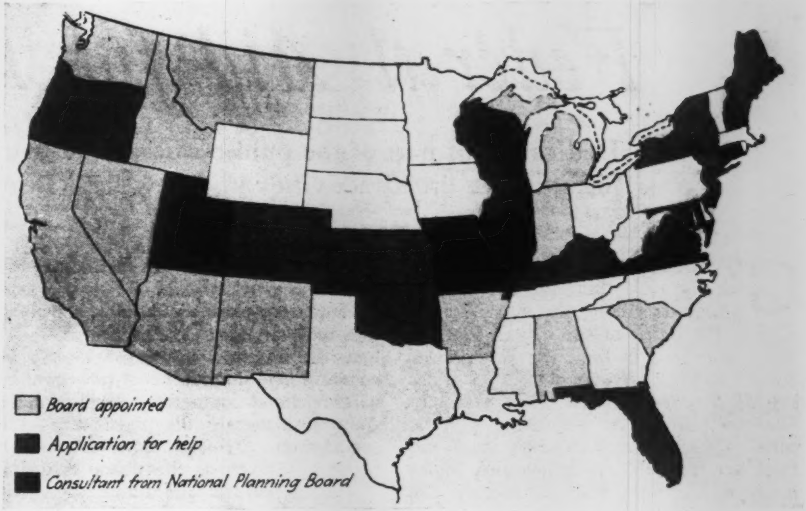
Cooperation with states

Perhaps the most notable progress in the organization and stimulation of planning endeavor has been in the state planning movement. Since the first of December, when the National Planning Board started its effort to secure the organization of state planning agencies, more than 30 state planning boards have been appointed and at least nine states are now at work with consultants assigned from Washington. The state planning movement is confined to no one section of the United States.

To assist state planning boards a "stimulation fund" has been allocated to the National Planning Board by the Public Works Administration for the employment of qualified consultants, who will be sent to advise with state planning boards to give reasonable assurances of office space, stenographic and drafting help, etc. Six general conditions precedent to the assignment of the consultant have been laid down by the board: appointment by the governor of an unpaid state planning board; assurance that the governor will support legislation to put the work on a continuing basis; supply of office space and assistants; a program of work; suggestion of consultant desired; cooperation with adjoining states.

A circular letter sent out by the board outlines a variety of studies which would be appropriate for state planning boards to undertake, and a special emphasis has been placed on a ten-year public-works program, a study of land use and a plan for an integrated transportation system. Studies of housing, population trends, recreation, water resources, local government reorganization, etc., have also been suggested where local conditions would make them appropriate.

New Hampshire (which was the first state to get under way with a state planning program), Illinois and Connecticut have been using assistants from the Civil Works Administration and have already made substantial progress in the collection of basic information for the preliminary state plan. Some states, such as Iowa and Wisconsin, had previously done a great deal of work in this field, and the state planning board of South Carolina has already submitted its first report.



OF THE 31 STATES having planning boards, slightly more than half are at present cooperating actively with the National Planning Board.

Beginnings of regional coordination

It is not for a moment supposed that a state plan can be made by a compilation of local and metropolitan plans, nor is it supposed that a national plan can be formed by simply putting together a series of state plans. There must be a basic skeleton design into which these subsidiary plans may be fitted. To assist in the formulation of such a skeleton design in the northwestern corner of the country, a Pacific Northwest Regional Planning Commission has already been organized under the chairmanship of the Regional Adviser of the Public Works Administration, including the chairmen of the four state planning boards in that region. Another regional study is proposed for New England. Such coordination of state projects will naturally assist in the larger undertaking of coordinating all of these units in the national plan.

A special case of planning for parts of several states is the Tennessee Valley Authority, which of course began its work before the national board.

Still another planning undertaking based on a river basin is illustrated by the Mississippi Valley Committee of the Public Works Administration. Starting with specific projects for flood control, the committee has been inevitably led into considering all the uses of the river for water supply, sewage and waste disposal, irrigation and reclamation, power, recreation and navigation. Then, in turn, these considerations have involved study of land uses, economic and social factors and other planning problems.

Some comprehensive questions

In the governmental set-up of the United States, we have not only the local and state government units to coordinate, but also numerous bureaus and administrative offices of the federal government itself. To promote the coordination and correlation of efforts by these federal planning agencies, the National Planning Board has suggested the desirability of a clearing-house of planning information through the organization of coordinating committees with representatives from the various bureaus concerned. Three such committees have already been set up.

A transportation committee, working with the Coordinator of Transportation, the Chief of the Bureau of Public Roads, Chief of Engineers, etc., was the first group organized, and has provided useful contact for exchange of information concerning use of dams for highways, necessity for drawbridges, substitution of highways for branch railroads which may be abandoned, etc.

The land planning committee, representing the departments of the Interior and Agriculture, has been engaged in studies of the submarginal land problem and on policies for withdrawal of these lands from farming use. A fund of $25,000,000 has been allocated to the Surplus Relief Corp. to purchase submarginal lands. The committee has also considered the conflict of policy within the government which is represented by approval of additional reclamation projects at the same time that the AAA was paying rental for destruction or curtailment of crops.

A third coordinating committee in the construction field has just devoted its first session to the problems of the agencies in the government concerned with housing policy. The Home Loan Bank Board, the housing division of the Public Works Administration, the bureau of home economics in agriculture, and the subsistence homestead division are among those concerned.

Providing for continuing growth

Finally, the board is working on a research program toward the preparation of what has been called "a plan for a plan"—in other words, a report on the best organization for continuous planning work. This research project is divided into two major parts, the first of which is devoted to economic, social and physical planning activities now going on, and the second dealing with planning for public works. It is hoped to have these researches and the report of the board in relation to them completed in about six months.

Through these various activities the National Planning Board is laying the foundations for a national plan which must grow out of our inheritance, our interests and activities. National planning is a continuing process, for a national plan will never be complete as long as the nation exists.

Federal Aid for Housing

Dedication of part of the public-works fund to aid in low-cost housing initiates broad activities in a new field throughout the country

GOVERNMENT housing aid, a wholly new thing in the United States, is among the most significant of the fruits of the depression. It was recognized in both the Emergency Relief and Construction Act of 1932 and the Recovery Act of 1933, and may now be said to be producing results, which, although small in wood, brick and steel, are nevertheless substantial. What progress has been made is largely due to the Recovery Act, which was more liberal than its predecessor, permitting housing aid not only to private but to public corporations, and, in addition, direct construction by the federal government.

Since the beginning of July the housing division of the Public Works Administration has been active. By Sept. 1, seven projects had been approved and loans authorized; by the end of January, 1934, twenty projects had been approved, and two were under construction. All told, something over 400 project proposals have been submitted, of which perhaps 20 per cent may be classed as good. Some of the others are inadequately planned or poorly located; the majority are not really low-cost housing for the groups of lowest income; some do not constitute genuine neighborhood community developments; some are merely disguised real-estate speculation. Social significance of a project is taken as the prime criterion.

The accompanying tabulation gives the present status of the twenty approved projects. In addition to those given in the list, a small housing project was built in the Virgin Islands by the government from PWA funds, but under other auspices than the housing division, and an RFC loan is being used for the $9,000,000 Knickerbocker Village project on the lower East Side of New York. The twenty approved projects represent approximately 16,500 family units. The projects range from $40,000 to $12,000,000 in total cost. The stipulated rentals will range from $4.50 to $11 per room per month. Most of them are located on land of moderate cost.

Slum clearance *per se* is not represented in the list of approved projects, and only a few of the projects contain a slum-clearance element. In the experience of the housing division the general problem of slum clearance is still far from being solved, and this because of the speculative value of lands and properties in slum areas.

The projects considered by the housing division so far involve no essential innovations in construction method or material, economies being obtained rather through reduction of financing, promotion and speculative costs, and through careful study of space planning.

The projects approved so far are all sponsored by private limited-dividend corporations regulated by state law. No public housing to be carried out by municipal housing authorities and thus eligible for a 30 per cent grant has been brought forward. Cincinnati and Cleveland, however, have such authorities, and Detroit has recently established one. Milwaukee has a similar body, under an old charter provision. New York City, at the end of January, received legislative permission to set up an authority to administer a $25,000,000 allotment made to it by the Public Works Emergency Housing Corporation. This federal corporation, organized in November, to plan and build federally owned housing projects in those cities in which effective action could not otherwise be obtained, has taken over several of the private projects that had been submitted to the housing division.

Whether the work of the PWA's housing division is looked upon as a mere specimen demonstration of possibilities, or as the establishment of a yardstick for commercial practices (like that set up by the Tennessee Valley Authority in the power-service field), or as the beginning of full governmental acceptance of responsibility for providing shelter for its citizens, it is certain that the present activities under the Recovery Act will have a long-time effect in molding housing philosophy and practices.

The PWA housing division is under the direction of Robert D. Kohn, and the executive staff includes N. Max Dunning and C. E. Pynchon as assistant directors, Eugene H. Klaber as chief of technical staff, H. D. Hynds as chief of construction, Frederic L. Ackerman as consultant, and J. M. Hamilton as assistant to the director.

HOUSING FOR WHICH ALLOCATIONS HAVE BEEN APPROVED BY THE PWA
(As of January 8, 1934)

Name	Location	Loan	Type of Structure	No. of Families	Rent per Room per Month	Area Covered
Under Construction						
Boulevard Gardens	Woodside, N. Y.	$3,450,000	Ten 6-story apts.	1,632	$11.00	Entire block
Euclid Housing Corp.	Euclid, Ohio	$1,000,000	Individual houses	300	$30 to $40*	50-ft. front lots
Transferred to P.W. Emergency Housing Corp.						
Cleveland Home	Cleveland, Ohio	$12,000,000	2- and 3-story apts., flats and row houses	4,500	$8.00 to $8.50	....
Techwood, Inc.	Atlanta, Ga.	$2,600,000	2- and 3-story apts.	557	$7.50 to $8.00	8 city blocks
University Housing	Atlanta, Ga.	$1,212,500	3-story apts.	800	$4.50 to $5.00	6 city blocks
Loan Agreement Signed						
Hillside Housing	Bronx, N. Y. City	$5,060,000	4-story apts. 6-story elev. apts.	1,435	$11.00	14½ acres
Boylan Realty Co.	Raleigh, N. C.	$200,000	3-story apts.	54	$10.00	1.14 acres
Juaniata Park	Philadelphia	$1,045,000	3-story apts.	292	$8.40	4¾ acres.
Final Legal Papers Being Drawn						
Spence Estate	Brooklyn, N. Y.	$2,025,000	6-story elev. bldg.	508	$11.00	1 city block
Hutchinson Suburban Housing	Hutchinson, Kan.	$40,000	Individual houses	20	$30†	2 A. per house
Neptune Gardens	Boston	$3,500,000	2-story row houses 3-story apts.	700	$8.50	44 acres
Sunshine Apts	Richmond, Va	$663,000	2-story apts	296	$5.50	15 acres
Altavista Housing	Altavista, Va.	$84,000	Individual houses	50	$4.25	13 acres
Data Being Submitted for Legal Requirements						
Lane Gardens	Cincinnati	$1,980,000	3- and 4-story apts.	572	$9.00	10 acres
Neighborhood Gardens	St. Louis	$500,000	3-story apts.	252	$9.75	2½ acres
Indianapolis Community	Indianapolis	$4,460,000	Individual houses 2-story flats 3-story apts.	810	$7.50 to $8.50	8.8 acres
Hallets Cove Garden	Queens, N. Y.	$2,975,000	6-story elev. apts.	680	$10.50	8 acres
Hillcreek Homes	Philadelphia	$1,290,000	Individual houses 3-story apts.	1,620‡	$7.50	23.9 acres
Roosevelt Terrace	San Francisco	$3,230,000	4-story apts. One 6-story elev. apt.	886	$11.00	19.5 acres
Harms Park	Chicago	$1,333,000	4-story apts	450	$9.50	5 acres

*Amortization and interest payment per month.
†Rent per month per house.
‡Rooms, not residential units.

APPRAISALS OF FOUR FIELDS OF ENGINEERING ACTIVITIES

Contracting Business

BY N. F. HELMERS
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IN SPITE of the constructive efforts of the Administration, the construction industry, to a large degree, marked time through most of 1933. Federal work under the Public Works Administration has been slow in getting started, but at this time it is showing definite and fairly rapid expansion and is providing work for a large number of representative contractors. Because of the rules and restrictions, partly legal but more departmental, under which this federal work is operating, many conservative contractors are going very slowly in taking on this work. There is much need of simplification and clarification of such rules, and there is particular need of realizing that efficient management of complex construction work cannot properly function if hampered by too many restrictions. It is, therefore, desirable that the restrictions be clarified and cut to the minimum as soon as possible.

In heavy construction, particularly, contractors bidding on federal work are finding new rules and regulations which in no way fit into the scheme of things as they have operated in the past, and it will be hard to determine fair value of these restrictions and their effect on the cost of the work. Not the least important is the question of hazard due to rules of employment, which to some degree deprive contractors of their own trained workmen, and the consequent effect on compensation insurance. Compensation rates have been markedly raised in the last year and largely on account of this.

Health depends on private construction

While it is apparent that the Administration feels the need of having the federal government carry on with construction as a means of providing employment until normal conditions return, it is quite evident that one of the things fundamentally wrong with the construction industry at this time is the lack of work of any volume coming from private industry. There is some hope at the present time that the railroads will begin a rehabilitation program, but this will be done largely with their ordinary operating forces. Serious consideration must be given to the braking effect of the high PWA wage scales as regards private construction in certain localities and areas. The construction of office buildings, hotels, apartment buildings and residences, of mills and power plants (both steam and hydro) are at the present time almost nonexistent. These are items which are, in normal times, the mainspring of construction.

I earnestly hope that the peculiar psychology which we have heard so much of in the last year—that profits be eliminated—will be overcome by a saner philosophy. The working man is never better off than when there is profit in industry. Lack of profit stifles industry, and the investing public can always turn to tax-free investments when the speculative gain on other items does not offer a sufficiently good market. It is hoped that this item will be given serious thought, not only by the Administration and by Congress but also by financial authorities and industrialists, for only by the expansion of profitable enterprise can the working man and the employer in the construction industry get back to normal.

CWA program is deplored

While well-planned public work under the PWA must go on, and undoubtedly will go on, the writer would seriously deplore the continuation of the so-called CWA, or Civil Works program. Any thinking person in the United States has been against the English dole system, and it is apparent that the organization of the CWA was to avoid the dole. We also realize that there was desperate need of getting money into the hands of those who had been for a long time out of employment. However, after viewing its operation and seeing men paid at hourly rates above that which private industry, in most cases, can afford to pay, and operating with a peculiar lack of planning and management, even when administered with the best of intentions, we are forced to the conclusion that it is wasteful in the extreme and is wrongly promoting the thought that government money is a "grab-bag" and that the world or the government owes the individual a living. Government and society do owe the individual an opportunity to earn a living, but the arrangements should be such that it is earned. Un-American as it is, the dole would be better.

The nation at large and the construction industry particularly have been wrestling with codification ever since the enactment of the National Recovery Act. The construction industry moved rapidly to formulate a code, but because of peculiar reasons that are not even yet clear to the writer this industry code has been opposed by organized labor and so delayed that it will not be in effect until March, 1934. It is my personal belief that the sooner the industry can operate under the code the sooner fair relations between management and labor can be effected.

Labor relations need improvement

That there is much need of better understanding with labor we all know. The construction industry offers a wonderful opportunity in the matter of industrial relations. It is my hope that the Associated General Contractors of America can take some real steps in connection with industrial relations and make some constructive moves to free the industry from the accusation of exploiting labor. In taking steps to prevent contractors from exploiting construction labor we must also see that labor is not exploited by others as well. There never was a time when there was greater need for the protection of free expression, free thinking and freedom of action on the part of the individual.

In spite of the present outlook, perhaps in some ways somewhat gloomy at the moment, there never has been a time which offers so much for the solving of the construction problems. These problems are not new, it is only that they seem to have come to a head. The contractor has been and perhaps always will be an individualist; but the present situation is forcing, or should force, this individual to the full realization of the fact that only by cooperation with others and through organization can he put his business where it belongs. An integrated construction industry is something we have never had before. It is an idea that is full of promise, and from what I have seen to date it already has, in the picture, men strong and courageous enough to work to the end of making the industry what it should be.

Engineering Research

BY F. E. RICHART
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DESPITE unfavorable business conditions which forced a widespread reduction in funds for research, some noteworthy work in engineering research was reported during the year 1933. In part, this represented the culmination of work begun years before; in other cases, industry was driven by necessity to a research program. At all events the increased time available for thoughtful study was conducive to sound and well-considered results. In this brief review of some of the outstanding work no attempt has been made to give a complete record or evaluation of the work accomplished.

Cement and concrete

In the field of cement and plain concrete, valuable contributions have been made on problems relating to the design and construction of Boulder Dam. In the development of portland cements with low evolution of heat, relations between chemical constituents and physical properties have been defined and given a popular interpretation which was hitherto lacking. An effect of this information is already becoming evident in the development of special cements for various purposes, instead of the hypothetical standard portland cement specified for all uses in the past. Besides studies of heat evolution, volume changes and strength of cements, carried on mainly by the Bureau of Reclamation and the University of California, many allied experiments have been made on the strength of concrete cured under ordinary mass-concrete conditions, the elastic and thermal properties of mass concrete, the effect of using 9-in. coarse aggregate in concrete, plastic flow and volume changes of concrete, accelerated field-strength tests and thermal properties of various aggregates.

Vibrated concrete

The experimental study of concrete placed by vibration has gone hand-in-hand with the commercial development of pneumatic and electric vibrators; a praiseworthy example of the substitution of scientific fact and quantitative records of performance for the usual promotional sales talk. The numerous researches have covered special features of vibration as applied to bridges, pavements, dams, roof slabs and various factory-made units.

Tests on concrete arches

An important investigation completed during the year was that on reinforced-concrete arches, conducted by a special committee of the American Society of Civil Engineers and including laboratory tests of several three-span continuous arches on slender elastic piers. These arches, of 27-ft. span, supported on sensitive weighing mechanisms so that all reactions were determinate, and with various types of superstructure, present the unusual combination of the largest laboratory structures on record, yet tested with a system of load, strain and displacement measurements of extreme precision. The results as to integral arch action, expansion joints and the behavior of slender piers should be of lasting practical value to engineers.

Concrete columns

The investigation of reinforced-concrete columns, sponsored by the American Concrete Institute, was closed with a final report, interpreting the test data and offering new design formulas. The investigation furnished a fund of needed information on the effect of plastic flow and other time relations on column action; also the effect of using materials having a wide range in quality. In one respect the work is incomplete, since eccentrically loaded columns, on which test data are sadly needed, were not included in the investigation.

The final report of the special committee on steel-column research of the American Society of Civil Engineers is the outstanding contribution on recent structural-steel research. It presents data from tests of a large group of columns of both rolled and built-up sections. Especial emphasis was given to the quality of metal from different parts of the section and to eccentricity of loading. A nominal amount of eccentricity, to be allowed for in all column design, was determined. Fitting the test data to the well-known secant formula, a rational column formula was chosen, and simplified parabolic formulas for working stresses are also proposed. A critical discussion of various column sections is given. The report should have a permanent and authoritative influence on the design of steel columns and compression truss members.

Of particular interest to structural engineers is the progress of research in welding, a field in which many developments are still guarded as trade secrets. Among the projects reported recently are tests of welding of nickel steel, of galvanized structural steel, of cast steel to cast or rolled steel, and experiments with arc-welding under water. Of great significance is the development of a method of examining welds by X-rays, making practicable the inspection of welds in plates exceeding 4 in. in thickness. The commercial possibilites of the scheme are seen in its use at Boulder Dam on several thousand feet of welded pipe, 13 to 30 ft. in diameter and up to 2¼ in. thick.

Researches on a variety of engineering materials have been described throughout the year. Perhaps the most inspirational of the research reports were a paper by H. J. Gough at the annual meeting of the American Society for Testing Materials on the subject of crystalline structure in relation to failure of metals, especially by fatigue, and one by H. J. French before the American Society for Steel Treating on fatigue and the hardening of steels. The first paper gave a conception of fatigue failure as deduced from X-ray studies of single crystals of metal and of small crystal groups. The other employed a critical analysis of a large mass of available test data on the fatigue resistance of steels, to establish a conception of the processes of age hardening and martensitization. The fundamental value of research work of this type is self-evident.

Highway problems

Highway research projects in progress probably number between 200 and 300. Numerous tests have been reported on such subjects as the curing of concrete pavements, weathering tests, fillers and cushion courses for brick pavements, experimental road tests on brick and on cement macadam, and studies of reinforcement and aggregate interlock in concrete pavements. Included in the highway field also are experiments on frictional resistances of various pavement surfaces and studies of tractive resistance. There may be properly included as research the numerous traffic surveys in progress and recent studies by the Portland Cement Association, correlating the design of concrete highways with the type and density of traffic they are to carry.

Reinforced brick masonry

Reinforced brick masonry is reaching the stage of extensive laboratory investigation. Tests at the Bureau of

Standards and at many college laboratories have covered various phases of the strength of reinforced beams, columns, slabs, piers and auxiliary specimens. The selection of masonry mortars to secure the optimum bond with a given kind of brick is a major problem. The porosity of the brick, its rate of absorption and the water-holding properties of the mortar are important factors. The year has seen very satisfactory progress in this field.

In the field of soil mechanics an outstanding contribution is the progress report of the committee on earths and foundations of the American Society of Civil Engineers. The report is based largely on studies made at the Massachusetts Institute of Technology. The general problem of pressure distribution through soils and the mechanics of settlement in clay are outlined. The report contains settlement records of existing structures, and results of photoelastic research on models, which illustrate the stress distribution in and beneath footings.

Other laboratory researches involving soil mechanics include recent studies of soil consolidation, forming the basis of design or rolled-earth dams and the soil sampling and testing in connection with the foundations for the San Francisco Bay Bridge.

Of interest to hydraulic engineers are the experiments being conducted by the Mississippi River Commission in its Waterways Experiment Station, near Vicksburg. In this river laboratory, model tests are made to predict the effect of various efforts at river regulation, such as cutoffs of bends to stabilize the stream, the protection of banks and regulation of the navigable channel by contraction. Models of the Bonnet Carré, Boeuf and New Madrid floodways are used to study velocities and directions of flow, backwater limits, the erosion at high velocities and deposition of sediment. The model tests, combined with full-scale experiments, such as cutoffs on the Mississippi itself, give promise of disproving time-honored theories of river hydraulics, as well as a rapid solution of many difficult phases of the Mississippi river problem.

Research is needed now as much as ever before. There are a host of problems unsolved. The spirit of research is not greatly affected by economic or political disturbance. The coming year should see steady progress in the accumulation of engineering facts and the testing out of new theories and designs.

Public-Service Engineering

BY W. W. HORNER

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DURING the past year, the activities of the engineer in public service have been particularly affected by the continued economic depression, the political convulsion and the relief movement.

The continuing economic depression in the spring of 1933 required the engineer to prepare local and state works programs in the face of further reduction of tax funds, stiffened resistance from taxpayers (particularly from real estate interests) to all proposals for public construction, absence of a market for municipal and state bonds (with a few notable exceptions); and an even greater lack of demand for special tax warrants. In consequence, the amount of local public works was much further reduced than in the foregoing year.

With the hysterical crusade for reduction in personnel and expense resulting in the near cessation of public works, it might still have been expected that useful service could have been found for the engineering corps and their dissolution more nearly avoided. Even were funds not in actual sight for construction, emphasis should obviously have been placed upon plans for the future so that in due time public works might again proceed logically and efficiently. The efforts of the executive engineer to bring in long-term planning or to hold together his engineering organization for that purpose or in that way were not generally acceptable. Thus also, we saw the employed engineer at the beginning of the calendar year in the state of prolonged uncertainty and concern; general unemployment in the profession was definitely on the increase.

Effects of political turnover

At this stage, widespread administrative changes, local and state, as well as federal, began to affect the engineer in public service. After years of effort to bring into existence stable and continuing engineer groups responsible for the conduct of municipal business, and, in recent times, a feeling of real accomplishment in that direction, the wholesale dismissal of engineers trained in public office was regarded by many as calamitous. We observe that the number of engineers employed after this surprising political convulsion was not appreciably altered, but that the experienced and trained public servants were almost universally replaced by men untried in that field. We cannot contend that this situation was entirely unfortunate, for many engineers needed employment more than did those superseded, and in some cases new ideas and new ideals were obviously desirable. However, from the viewpoint of efficiency and accomplishment, public works and planning were definitely slowed up and future engineering developments delayed during the transition into the New Deal, with the ultimate effect still to be determined.

It is clear that these changes are not merely the result of political patronage on an unusually extensive scale but are indirectly the result of a changing social and economic thought which is in part characterized by the National Recovery Act. The federal legislation of 1933 and the companion acts of states and cities involved the public-works engineer immediately and indirectly in the maelstrom of codes as they affect public construction. On their account, he has had to develop new ideas of construction operations and their industrial background. To a great extent, this situation is no clearer in its public service phase than in its effect on industry itself.

More directly the municipal and state engineer has had to face the task of developing his share of the public-works program, a work carried out during part of the year, with insufficient and often inexperienced assistance.

Public-works program stimulating

The national public-works movement has had a stimulating effect in municipal and state engineering affairs. In old organizations, it has definitely stopped further reduction of personnel, and, in some cases, produced re-employment of the engineer. In all phases it has created activity and often overwork. The PWA has itself required new, large engineering organizations through state engineer offices and the great headquarters staff at Washington. Because of the public-works movement the technical public service and those qualified to enter it experienced a more satisfactory return from unemployment than their less fortunate brethren in the manufacturing industries.

Toward the end of the year the formation of the CWA and the call by the social-service relief organizations for engineers to direct the new movement brought administrative service to thousands. It has also temporarily put other thousands in public service for the first time, not altogether a satisfactory initiation but one at least affording a living; some of the projects of a strictly engineering character, such as regional planning, are producing results of permanent value.

The previous national administration was termed an engineers' régime; it was natural to presume that the engineer might, be somewhat discredited after the political turnover; the present continuing placement of responsibility upon the engineer as an executive in public service is gratifying; the engineer in public service during the last year has suffered privation but has gained in prestige. If we are at the beginning of a new economic era in which government is to take over many affairs formerly handled by private initiative, then the engineer in public service is well situated for the assumption of greater leadership than ever before.

Engineering Education

BY H. P. HAMMOND

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WITH the customary lag of two or three years after major swings in the business cycle, engineering education began in 1933 seriously to feel the cumulative effects of the depression. Serious as conditions have become, however, they do not, as yet, approach in severity the effects of the depression as felt by business and industry.

Briefly summarized, the year brought a general decrease in revenues, more severe in some sections and in some types of institutions than in others, but widely prevalent and of serious magnitude on the whole; a fairly sharp decline in student enrollment; enforced curtailment of many types of activities, such as research; decrease of salaries in many colleges, ranging up to 32 per cent; some, though not as yet in most institutions numerically great, reductions in teaching staffs; in general, a cutting of the garment to fit a reduced amount of cloth; and, worst of all, the harsh grip of real privation among thousands of students, and that most disheartening of all conditions, no job for the graduate.

The picture is not an entirely dark one, however. A few institutions have gone forward with courageous long-range plans for the future and even with expansion of facilities; the great group of colleges remains on an essentially sound basis; there have been several desirable eliminations of unnecessary institutions and consolidations of departments; a trimming off of unessentials; and there has been much evidence of increased seriousness of purpose on many campuses.

Engineering educators, on the whole, have faced conditions courageously and with a deep conviction of the essential soundness of their work and of its place in the social order. This spirit was clearly manifested at the special conference of administrative officers of engineering colleges which was called during July by the Society for the Promotion of Engineering Education at the University of Wisconsin to consider the emergency situation. The general feeling there expressed was that, with all due allowances for the unquestioned seriousness of the situation, engineering education could face the future with confidence. The disinterested observer might, perhaps, have felt that there was undue optimism and failure to see, as President Elliott of Purdue expressed it, that "The very foundations of the professional house, in which we have lived and worked these many years, with more or less comfort, and with a firm confidence as to its stability, seem to be shaking and shifting."

Declining enrollment

What the immediate future will bring to the engineering schools no one, of course, can predict with any certainty. The prospect, however, as indicated by one factor—i.e., student enrollment—is not encouraging. From a peak of 73,000 in 1930-'31, the number decreased to 63,000 in 1932-'33, a decline of about 7 per cent per year. This decline has continued into the present year, though figures are not available to indicate its extent accurately. Prediction of what may be expected in the next few years may be hazarded on the fact that numbers of freshmen declined from 25,000 in 1930-'31 to 17,000 in 1932-'33, or at the rate of 16 per cent per year, more than double that of enrollments in all classes combined, and considerably greater than in higher education at large. Such decreases are not surprising in view of general public knowledge of lack of opportunities for graduates at present, and are probably not an unmixed evil. The more serious aspect of this shrinkage is the resulting decrease of institutional revenues and the feeling of discouragement, amounting in some instances almost to demoralization, on the part of administration and faculty, particularly since the result in many instances is the curtailment of productive scholarship and research.

Thus far no clearly discernible or widely prevalent changes in objectives or in curricula have manifested themselves—again there seems to be the lag of a few years as compared with industrial and economic change. Higher education has not felt the impact of enforced regulation or codification and will doubtless feel its way into the new situations slowly. A good deal of quiet, but nevertheless intensive, consideration of the new conditions has been going on, however. The length of the undergraduate curriculum is again under consideration with strong advocates of five years instead of four, both because of increasing pressure for a broader and at the same time a more intensive training and because of increased time opportunity of students. That there will be a sudden or universal change to five years is to be doubted. Four years of undergraduate work is pretty firmly entrenched, and it is not easy to break with tradition in education. Further, the relatively small but important group of privately endowed schools of technology, in which a change to five years would be fraught with more serious problems than it would in publicly supported universities, will perhaps, tend to hold the whole group of engineering colleges to the four-year norm.

Steadily increasing attention to and enrollments in post-graduate work have continued or even accelerated during the depression years—a trend that is almost universally regarded as desirable. Increased attention to economic relationships, in the broad sense, has also continued, coupled with the growing conviction that engineers of the future must be made fully aware of their social responsibilities in addition to being grounded in the scientific and technical tools of their profession. This trend, clearly discerned during the past decade, has been gathering strength since 1930.

Finally, there has appeared recently some indication, which may or may not be significant, of the introduction, in addition to but not superseding the old-line curricula, of broader programs of study having more general and less definitely defined objectives, in terms of vocational needs, than the traditional chemical, civil, electrical, mechanical, mining group. These programs have in some instances been designated "general engineering," and are thus a revival, with modifications, of such courses offered rather widely a few decades ago, while some go so far as to be indicated by the designation "liberal science." They are avowedly intended to meet the needs and the desires of those students who would prepare themselves for careers in a society based as it is in large measure on scientific discovery, technological development, and economic application, but who are not attracted by the promised opportunities —or their lack—in a career for which they presume the regular engineering curricula are intended to prepare them.

This trend, if the few instances thus far of the introduction of such curricula develop into a movement, the writer considers wholly desirable, not only from the standpoint of the possibility of thus conserving engineering college enrollment, finances and morale (the expedient aspects of the situation), but also from the standpoint of greater public service and a broadening of the horizon of engineering education.

Construction Code Signed by the President

Effective on Mar. 2, the code will be administered by an authority set up by the sponsoring organizations—Labor to have equal representation on a national planning board

SIGNATURE by President Roosevelt of the code of fair competition for the construction industry on Wednesday, Jan. 31, places this industry at last under NRA operations. The code will be effective and binding on the entire industry, from house builders to the large contracting and engineering firms (including architects and engineers) after March 2.

As finally approved, the code is made up of a number of chapters, each chapter, after the first, being devoted to a specific division of the industry such as general contractors, engineers and architects. Chapter I is entitled "General Provisions" and is in effect the master code that was proposed in the early studies of construction codes. Chapter I, substantially complete, is given below; Chapter II, although not signed as this is written, is on p. 213.

CHAPTER I—GENERAL PROVISIONS

ARTICLE I—APPLICATION

The provisions of this code shall apply to the entire industry as hereinafter defined, excluding operations therein undertaken in accordance with bona fide bids made or contracts entered into prior to the effective date; except that the provisions of each chapter incorporated in this code shall apply only to the division or subdivision of the industry defined in such chapter. In the case of conflict between such chapter provisions and the general provisions of this code, the chapter provisions shall govern. If any other code of fair competition or a provision thereof, heretofore or hereafter approved by the President, shall conflict with this code or with any provisions thereof, the Administrator may hold such hearings as he may deem necessary and thereafter may, if in his judgment justice requires, grant such stay or exception or make such other determination as he may deem advisable in order to effectuate the Act.

ARTICLE II—DEFINITIONS

Sect. 1—The term "construction industry" or "the industry" as used herein shall include the designing and the constructing of (and the installing and the applying, including the assembling at the site, of manufactured parts and products incorporated in and to):

(a) building structures, including modifications thereof and fixed construction accessory thereto, intended for use as shelter; and other

(b) fixed structures and other fixed improvements and modifications thereof, intended for use in industry, commerce, sanitation, transportation, communication, flood control, power development, reclamation and other similar projects or services; and such related divisions or subdivisions thereof as may be defined in chapters hereof, and included hereunder with the approval of the President, made 60 days prior to the effective date.

Sect. 2—The term "division of the industry" or "division" as used herein shall mean a branch of the industry which has been or may hereafter be defined in a particular chapter of this Code. The term "subdivision of the industry" or "subdivision" shall mean a defined section of a division.

Sect. 3—The term "member of the industry" as used herein includes any individual or form of organization or enterprise engaged in any phase, or undertaking to perform any of the functions of the industry as defined in Sect. 1 hereof either as an employer or on his own behalf, including also but without limitation, architects, engineers, contractors and subcontractors.

Sects. 4 to 7—[Furnishes definitions of other terms referred to in the code.]

Sect. 8—The term "effective date" as used herein shall mean the 30th day after the approval of this code by the President provided that in respect of a particular division an earlier effective date may be specified in the chapter applicable to such division.

Code sponsors

Sect. 9—The term "sponsors of the code" as used herein means the following national associations of members of the industry which have applied for the approval of this code and signified their assent thereto:

1. Construction League of the United States
2. American Institute of Architects
3. American Society of Civil Engineers
4. Associated General Contractors of America
5. International Society of Master Painters and Decorators, Inc.
6. National Association of Marble Dealers
7. Heating, Piping and Air Conditioning Contractors National Association
8. Cement-Gun Contractors Association
9. National Building Granite Quarries Association
10. Contracting Plasterers International Association
11. Tile and Mantel Contractors Association of America
12. National Association of Master Plumbers of the U. S.
13. National Elevator Manufacturing Industry
14. Roofing and Sheet Metal Industries Conference
15. Mason Contractors Association of the U. S. and Canada
16. American Road Builders Association
17. National Association of Metal Furring and Lathing Contractors
18. Asbestes Contractors National Association
19. National Association of Building Trades Employers
20. National Association of Builders Exchanges
21. American Construction Council

and such other national associations of members of the industry as shall in like fashion hereafter sponsor additional chapters of this code.

Sect. 10—The term "this code" as used herein shall mean and include, unless the context clearly indicates otherwise, all chapters from time to time included herein, together with any modifications or amendments thereto.

Sect. 11—Population, for purposes of this code, shall be determined by reference to the 1930 federal census.

ARTICLE III—WAGES AND EMPLOYMENT

Sect. 1—In each division or subdivision of the industry, as defined in the chapter incorporated in this code relating thereto, truly representative associations or groups of employers and employees respectively concerned, after proper notice and hearing and as a result of bona fide collective bargaining, may establish by mutual agreement (when approved by the President as provided in section 7 (b) of the Act), for a specifically defined region or locality the standards of hours of labor, rates of pay and such other conditions of employment, relating to occupations or types of operations in such division or subdivision, as may be necessary to effectuate the policy of Title I of the Act. The terms of such an agreement between the employers and employees of a division or subdivision of the industry shall not be binding upon the employers and employees of any other division or subdivision of the industry.

After the President has approved any such agreement arrived at within any such division or subdivision, and after proper notice of such approval, it shall be deemed prima facie unfair competition for any employer in such division or subdivision to fail to comply with the standards of maximum hours of labor, minimum rates of pay or other conditions of employment s approved and prescribed by the President, in respect of the performance within the defined region or locality of the types of operations concerned; and the failure of such an employer to desist from such unfair competition after being given due notice and opportunity to be heard, shall constitute a violation of the requirements of this code.

The Administrator shall establish one or more boards for each division or subdivision of the industry concerned to investigate any complaints of unfair competition as defined in this section. Each such board shall consist of two representatives each of employers and employees of the division or subdivision affected, selected by the Administrator from nominations made by such employers and employees respectively in such manner as the Administrator may approve or prescribe, and an impartial chairman named by the Administrator from nominations made by the employer and employee representatives selected to the board. Each board shall give notice and opportunity to be heard to each complainant and respondent and thereafter notify said parties of its findings and report them to the Administrator, as a basis for appropriate action to enforce the requirements of this code. The provisions of this section shall not be construed to limit the power of the President, in the absence of such a mutual agreement, to exercise any authority conferred upon him under section 7 (*c*) of the Act.

Sect. 2—Where no applicable mutual agreement, as provided in Sect. 1 of this Article, shall have been approved, employers shall comply with the following provisions as to minimum rates of pay, and maximum hours of labor:

(a) No employee, excluding accounting, office and clerical employees, shall be paid at less than the rate of 40c. per hour; provided, however, that the provisions of this paragraph *(a)* shall not be construed as establishing a minimum rate of pay for other than common or unskilled labor; and provided further that such provisions shall not be construed to authorize reductions in existing rates of pay.

No accounting, office or clerical employees shall be paid at less than the rate of $15 per week in any city of over 500,000 population or in the immediate trade area of such city; $14.50 per week in any city of between 250,000 and 500,000 population or in the immediate trade area of such city; $14 per week in any city of between 2,500 and 250,000 population or in the immediate trade area of such city; and $12 per week in towns of less than 2,500 population.

The foregoing provisions of this paragraph A establish a minimum rate of pay which shall apply, irrespective of whether an employee is actually compensated on a time-rate, piece-work or other basis.

B. No employee shall be permitted to work in excess of 40 hours per week or in excess of 8 hours in any 24-hour period, with the following exceptions and limitations:

1. On application of the interested parties and after approval of the National Construction Planning and Adjustment Board or Regional Boards established by it, an employee may be permitted to work 48 hours in any one week when the following conditions obtain:

(a) On projects located at points so remote and inaccessible that camps or floating plants are necessary for the housing or boarding of a majority of the labor employed.

(b) On such remote projects when working time has been lost because of inclement weather or unavoidable delays in any one week, it may be made up in the following four weeks.

(c) On projects in localities where a sufficient amount of qualified labor is not available in the immediate vicinity of the work.

2. The foregoing maximum hours of work shall not be construed as a minimum either for a day or for a week, and if at any time in any locality truly representative groups of employees in a division or subdivision of the industry through their chosen representatives express by written request to their employer or employers a desire to share available work in such division or subdivision, the number of hours of work may be reduced by mutual agreement between such employees and their employer or employers. In the event of inability to arrive at an agreement which will not involve undue hardship on either employees or employers, then such difference, with the consent of all parties in interest, may be submitted to the National Construction Planning and Adjustment Board for a decision. The national board may require the regional boards to secure facts and full information relative to such dispute and submit the same to the national board for its information.

It is not, however, the intent of this provision that any such reduction will be recommended by the national board to be put into effect if it appears probable that undue hardship might be occasioned thereby to either employers or employees.

3. The following classes of employees are exempt:

(a) Employees engaged in professional, executive or supervisory work.

(b) Employees in establishments employing not more than two persons in towns of less than 2,500 population, which town are not part of a larger trade area.

(c) Employees engaged in emergency work, involving breakdowns or protection of life or property.

(d) Watchmen.

(e) Other employees who may be exempted in chapters of this code specifically applicable only to the divisions or subdivisions of the industry therein defined.

4. Accounting, clerical or office employees may be permitted to work not in excess of 40 hours per week averaged over a period of four consecutive weeks.

(c) No employer shall knowingly permit any employee to work for a total number of hours in excess of the hours herein prescribed, whether employed by one or more employers.

Exemptions

Section 3—Where provisions concerning hours of labor or rates of pay have been established for specific projects, by competent governmental authority or agencies (whether federal, state or political subdivisions thereof) acting in accordance with law, any employer required to comply and complying with the provisions so established shall be relieved of compliance with any conflicting provisions of this article or of any actions taken in accordance therewith.

Any employer required to comply and complying with the provisions of a valid labor agreement in force on the effective date shall be relieved to the extent of his legal obligations thereunder of compliance during the period of such agreement, with any conflicting provisions of this article, or of any actions taken in accordance therewith.

Section 4—No employer shall employ any person under the age of 16 years, or under the age of 18 years in any occupation hazardous in nature or dangerous to health.

National Planning Board

Section 5—There shall be established within 30 days from the effective date of this code a National Construction Planning and Adjustment Board, and said board shall consist of 21 persons, ten of whom shall be selected by the Industrial Advisory Board of the National Recovery Administration from nominations of the Construction Code Authority, and ten shall be selected by the Labor Advisory Board of the National Recovery Administration from nominations of the construction employee organizations, the selection in each case to be subject to the approval of the Administrator, and one person to act as a disinterested chairman to be selected by the President upon the recommendation of the Administrator.

The National Construction Planning and Adjustment Board shall have for its fundamental purpose the planning and development of policies that embrace the broad spirit of cooperation and good will in the furtherance of all matters that relate to the promotion of better relations between employers and employees within the industry and the furtherance of other matters of their mutual interest. It shall have authority upon its own motion to select technical advisers and seek the cooperation of all factors involved in the stabilization and promotion of the well-being of both employers and employees in the industry and shall have authority to make such rules and regulations for its own conduct as it may deem necessary.

It shall, in its own discretion, following the submission by consent of all parties in interest of any difference within or between any divisions or subdivisions of the industry, give consideration and make determinations on all such differences as may arise relating to wages, hours of employment and working conditions. The decisions of the National Construction Planning and Adjustment Board shall be final and binding on all parties in interest except that in the event the representative of the government, the disinterested chairman, shall dissent from the conclusions, the decision shall be held in abeyance until approval or disapproval of same has been given by the Administrator.

The National Construction Planning and Adjustment Board shall have the authority, and upon its own motion shall establish in properly defined areas regional construction planning and adjustment boards, and said boards shall be composed of an equal number of members from employer groups and employee groups, and it is further provided that there shall be no disinterested or impartial chairman of said regional boards, it being provided that such boards shall select from their members a chairman and secretary. The National Construction Planning and Adjustment Board shall upon its own motion submit to the regional boards such problems for study as may in the opinion of the national board be necessary, and such reports of the regional boards shall be submitted to the final examination of the national board. To these regional construction planning and adjustment boards may be submitted matters from their respective areas of disputes having the same relationship as matters to be submitted to the national board, and every effort on their part shall be made to reconcile such existing differences with the requirements that their action shall in all instances be submitted to the national board for final action.

Nothing in this section shall be construed as preventing employers and employees in any division or subdivision of the industry as defined in the chapter incorporated in this code relating thereto from submitting to the boards provided for in Article III, Sect. 1, or other boards similarly composed and selected for consideration and determination, differences that may arise relating to wages, hours of employment and working conditions, subject to the approval of the Administrator. The findings of fact and determination of such boards shall be submitted to the national board for its information. The cost of conducting the national and regional boards herein provided for shall be borne by the Construction Code Authority subject to a budget submitted to and approved by it, provided, however, that the cost of services and the expenses of the members of said boards shall not be paid by the authority.

ARTICLE IV—ADMINISTRATION

To further effectuate the policies of the Act and to administer this code within the industry and its divisions and subdivisions, there shall be established a Construction Code Authority, and Divisional Code Authorities, and other administrative agencies as hereinafter provided:

A—Construction Code Authority

Sect. 1—The Construction Code Authority shall consist of one member selected from and appointed by each of the sponsors of this code, except that the Associated General Contractors of America may appoint thereto not more than four (4) members, one of such members to be selected respectively from each of the following component membership groups of said organization: Building Construction, Highway Construction, Railroad Construction, Public Works and other types of construction not heretofore specifically enumerated; together with not more than three non-voting members to be appointed by the Administrator to act as his representatives. To the Construction Code Authority as so constituted and established there may be designated not more than one additional member in respect of each additional chapter hereafter incorporated herein. Voting members are subject to replacement by the selecting agency with the approval of the Administrator.

Section 2—The Construction Code Authority, acting as a unit or through any designated committee or department created by it from its membership, shall have, in addition to any other powers or duties herein conferred upon it, the following powers and duties:

(*a*) It may establish rules and regulations for the conduct of its affairs; and may appoint such committees, agencies and representatives, and delegate to them such of its powers and duties as it may deem necessary for the proper discharge of its functions hereunder.

(*b*) It shall be empowered to cooperate with the Administrator in making investigations and surveys concerning the functions of this code, the observance of its provisions and other pertinent matters whether at the request of the Administrator or otherwise, and report its findings and recommendations to the Administrator.

(*c*) It shall collect from members of the industry and compile and furnish to the Administrator any reports and other information required under the act. Except as may be required for the effective enforcement of the provisions of this code the reports of individual members of the industry required under this code shall be confidential and only compiled summaries of such individual reports shall be furnished.

(*d*) In order to collect the information for the Administrator herein called for, it may require, either directly or through any Divisional Code Authority, the registration, in such manner as it may deem appropriate, of all construction work or services of or in excess of $2,000 in value, and in order to defray the expenses of such registration and of the administration of this code may apportion such expenses on the basis of the value of the work or services so registered, but in no case shall the charge be less than $2. The proceeds derived therefrom shall be apportioned upon an equitable basis between the Construction Code Authority and such Divisional Code Authorities as shall cooperate in procuring the registration of such work or services.

(*e*) It may propose modifications of or amendments to the general provisions of this code which, after submission to the Divisional Code Authorities affected thereby, may be recommended to the President for his approval, and upon such approval, following such notice and hearing as he may prescribe, shall have full force and effect as provisions hereof.

(*f*) It may exercise the foregoing powers and duties in any division of the industry for which no Divisional Code Authority shall have been established; and, if in its opinion the policies of the Act require, it may recommend to the Administrator that an additional chapter of this code be established for any such division of the industry.

(*g*) Its members or authorized representatives may attend meetings of any Divisional Code Authority, and it may at any time make appropriate recommendations to the Administrator to insure the proper functioning or representative character of any such Divisional Code Authority.

(*h*) It may secure an equitable and proportionate payment of the expenses of its establishment, maintenance and activities from members of the industry.

B—Divisional Code Authorities

Sect. 1—There shall be established for each division of the industry a Divisional Code Authority which shall, within the limitations provided herein, administer within such division, this Code and the provisions of any chapter hereof applicable specifically to such division. The procedure for establishing each such Divisional Code Authority shall be defined in the chapter pertaining to that division of the industry.

Sect. 2—[Sets forth the powers and duties of the Divisional Code Authorities which include cooperating with the Administrator and with the Construction Code Authority in making investigations as to the functioning and observance of any provisions of this code; in making such recommendations to the Administrator as it deems desirable for modification of its divisional code; receiving and adjusting all complaints as to trade practices between members of its division; and securing an equitable and proportionate payment of its expenses from members of its division.]

C—Representation and Membership

Sect. 1—[This section provides means, through the Administrator, for making the code authorities truly representative]

Sect. 2—[Provides principally for the submission of necessary reports to the Administrator and removes partnership liability from code authorities or committees.]

ARTICLE V—APPEALS BOARD

Sect. 1—The Construction Code Authority shall establish, under rules and regulations prescribed by and subject to the approval of the Administrator, a suitable agency to be known as the Construction Appeals Board, to consist of one architect, one professional engineer, three general contractors and four special contractors.

Sect. 2—[The Construction Appeals Board shall hear and determine the appeals referred to in Section 3 of this Article and shall likewise be empowered to determine, in the event of a conflict between the provisions of the various chapters hereof, applicable to specific divisions or subdivisions of the industry, which of such chapter provisions shall govern.

Sect. 3—Any interested party shall have the right of complaint to the appropriate divisional code authority and of a prompt hearing and decision in respect of any decision, rule, regulation, order or finding made by such authority or its agencies, and the decision may be appealed to the Construction Appeals Board.

Sect. 4—Any interested party shall have the right of appeal to the Administrator in respect to decision, rule, regulation, order or finding of the Construction Code Authority or the Construction Appeals Board.

Sect. 5—No decision, rule, regulation, order or finding shall be made by any code authority or other administrative agency, excluding the boards provided for in Article III hereof, of or in any dispute between employers and employees, or between groups of employees, including, in such last-named classes of disputes, any case or controversy whose determination would directly involve or affect any dispute between groups of employees as to the right to perform specific types of work or operations, including cases commonly known as trade jurisdictional disputes.

ARTICLE VI—ADJUSTMENTS

In the event that any member of the industry subject to this code, shall have contracted before June 16, 1933, to purchase goods, structures, or parts thereof at a fixed price for delivery after that date and prior to the expiration of this code, it is equitable and promotive of the policies of the Act that an appropriate adjustment of said price be made to meet any increase in cost to the seller caused by the seller's having signed the President's Reemployment Agreement or having become bound by any code of fair competition approved by the President; provided, however, that in view of the fact that construction operations customarily involve the furnishing of various goods and structures, or parts thereof by a continuous series of independent long-term contracts and agreements at fixed prices between various parties, such as owners (including government departments), contractors, subcontractors and others, such adjustments may be made contingent upon similar appropriate adjustments to be made by all other parties thus participating, from and including the initial vendor of such goods and structures or parts thereof to and including the owners of the works or structure upon which they are used.

ARTICLE VII—
BIDDING PRACTICES

Sect. 1—(a) The term "competitive bidding" as used herein shall mean the submission at or before a definite predetermined time of comparable proposals by two or more invited persons to an awarding authority to execute a specific program of work, furnishing a definite service or supplying a material specifically required for a particular project at a stipulated price. This does not include furnishing quotations on standard products.

(b) The term "awarding authority" as used herein shall mean any member of the industry who may upon competitive bidding award contracts.

Sect. 2 (a)—The practices commonly known as "bid peddling" or "bid shopping" are recognized as unfair and are prohibited. Bid peddling in effect means the offering by the bidder prior to the making of an award of a substitute bid or price lower than the one originally bid without a commensurate decrease in the requirements of the job. The correction of the abuses resulting from such practice is obtainable by regulation restricting or controlling bidders.

(b) Bid shopping in effect means the effort on the part of the awarding authority to induce a bidder prior to the making of the award to lower his original bid price without a commensurate decrease in the requirements of the job. The correction of the abuses resulting from such practice is obtainable by regulation restricting or controlling the awarding authority.

Sect. 3 (a)—Since it is recognized that the preparation of a bid is a service involving an expense to the bidder and that the inviting of an unreasonable number of bids is an economic waste, the awarding authority shall not invite an unnecessary number of bids.

(b) Only a limited number of alternate proposals shall be required in connection with any bid, and no alternate proposals of a bidder shall be considered by the awarding authority, unless the privilege of alternate proposals is extended to all bidders.

Sect. 4—The awarding authority shall make available uniformly to all bidders, plans and/or specifications or other requisite information which shall be sufficiently complete to enable each bidder to prepare a definite bid in accordance with the regulations herein provided for. He shall prescribe terms of competition which shall insure parity of standing to all bidders.

Sect. 5—The awarding authority shall not invite bids from a bidder unless such bidder shall have demonstrated to the satisfaction of the awarding authority that he is competent technically and financially to perform the work, and the ability of a bidder to obtain a performance bond shall not be regarded as the sole test of such bidder's competency.

Sect. 6—An award if made shall be made at the bidder's original bid price. It is recognized that competition based solely on price is sometimes unfair and accordingly the awarding authority may make an award to a competitive bidder other than the lowest bidder provided the award is made at such competitor's original bid price.

Sect. 7—The awarding authority shall designate a specific hour and place for receiving competitive bids. All bids to be submitted by subcontractors shall be delivered to the contractor at least 24 hours prior to the time set for the receipt of the bid of said contractor by the awarding authority. Bids received after such time or from uninvited bidders shall be returned unopened.

Sect. 8—The awarding authority shall not at any time prior to the specified time for the receipt of bids convey to any bidder information relating to the price or terms of any other bid in order to influence the price or terms of such bidder.

Sect. 9—There shall be no collusion between the awarding authority and any bidder, nor between the different bidders in the preparation of any bid. The awarding authority shall not use any bid which is so unduly low as to indicate an error or mistake in estimating without first giving the bidder the opportunity of demonstrating by cost sheets or other methods the correctness of the bid that he has submitted.

Sect. 10—The awarding authority shall make an award or reject all bids for the principal contract with the owner within 20 days after the stipulated time for the receiving of bids except where an extension of time has been requested from the bidders and has been consented to by two or more bidders. In the case of bids conditioned upon the award of a previous contract, each succeeding awarding authority shall make an award or reject all bids within 30 days after the award of such previous contract except as to such bidders as shall agree to an extension of time. The right to reject any or all bids may be reserved by the awarding authority, and such rejection shall be made in writing. Where all bids are rejected, bids shall not be again invited or submitted for the mere purpose of obtaining a lower or revised price or prices for substantially the same work previous to the elapse of 90 days from the date of such rejection, except there be a substantial change in the plans and/or specifications, or except there be evidence of collusion, or except there be such a marked difference between the bids submitted and the awarding authority's estimate as to the valuation of the work as would indicate to the awarding authority and his Code Authority the necessity of new bids in order to secure fair competition.

Sect. 11—Before making an award the awarding authority may require any bidder to name the subcontractors whom such bidder intends to employ for the various divisions of the work bid upon.

Sect. 12—The awarding authority shall not accept rebates, refunds, discounts, or other special allowances or services from a bidder unless included by the bidder in his original bid.

Sect. 13—The various divisions and subdivisions of the industry may provide in the chapter specifically applicable to such divisions or subdivisions, that members of the division or subdivision shall not submit a competitive bid, as defined in Sect. 1 *(a)* of this article, to an owner or any other person, corresponding to an awarding authority as herein defined unless such owner or other person agrees to comply with the regulations provided herein governing an awarding authority.

Sect. 14—In order to enforce the practice of fair competitive bidding, the Divisional Code Authorities shall provide, if no such method is provided in the chapter applicable to such division, a method satisfactory to the Construction Code Authority for checking bids submitted by members of such division either by designating a depository for the filing of duplicate bids or by some other acceptable method. The Construction Code Authority may require such changes in any such method as may be necessary to prevent conflict between the various methods which may be adopted by the various Divisional Code Authorities.

ARTICLE VIII—
GENERAL

Sect. 1—Employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection; no employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing or assisting a labor organization of his own choosing; employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment, approved or prescribed by the President.

Sect. 2—Employers shall not classify employees or duties or occupations performed by employees with the intention of defeating the purposes of the Act.

Sect. 3—No provision of this Code shall supersede any State or Federal law imposing more stringent requirements in employers regulating the age of employees, wages, hours of work, or health, fire or general working conditions than those contained in this Code.

Sect. 4—[Code shall not be construed as permitting or promoting monopolies.]

Sect. 5—[Additional chapters to the code may be submitted to the President for approval, either through the Construction Code Authority or directly. Upon approval by the President, such chapter shall become an integral part of the code. Any exceptions to Chapter I in such a new chapter apply only to the division of the industry affected.]

Sect. 6—[President may cancel or modify provisions of code.]

Copies of the Code of Fair Competition for the Construction Industry may be obtained from the Superintendent of Documents, Washington, D. C. Each chapter is printed separately and sells at 5c. The above chapter is Chapter I—General Provisions.

CHAPTER II—GENERAL CONTRACTORS' DIVISION

(This chapter of the Construction Code has not been signed by the President and may be modified somewhat before approval)

ARTICLE I— DEFINITIONS

Sect. 1—The term "general contractor" is hereby defined to mean without limitation any individual, partnership, association, trust, trustee, trustee in bankruptcy, receiver, corporation or agency which undertakes, whether by formal contract or otherwise, to direct, superintend, coordinate and execute, either directly or through others, the work of constructing, substantially in its entirety, any fixed structural or physical improvement, or a modification thereof, or an addition or repair thereto, excluding any such operation aggregating in its entirety less than the sum of $1,000.

[The remainder of Article I exempts architects and professional engineers from inclusion under the above definition, and defines the term "association," as used in the chapter, as the Associated General Contractors of America, defines the term "sub-contractor," and sets forth the following subdivisions of the general contractors division of the industry: Chapter IIA, Building Contractors' Subdivision; Chapter IIB, Heavy Construction and Railroad Contractors' Subdivision; Chapter IIC, Highway Contractors' Subdivision.]

ARTICLE II— ADMINISTRATION

[This article establishes the divisional code authority for general contractors, consisting of 17 members, 12 from the A.G.C., and five from outside the A.G.C.; defines the powers and duties of the divisional code authority and the powers and duties of subdivisional administrative committees or agencies to be set up by the divisional code authority. Under the provisions of the general code for the construction industry (Chapter I), the divisional code authority may require a registration with it by general contractors of all work costing $2,000 or over, and may collect a fee not to exceed one-tenth of 1 per cent of the value of the work to defray its expenses and the general contractors' proportionate share of the expenses of the construction code authority.]

ARTICLE III—APPEALS

[The three sections of Article III outline the methods of making appeals in controversies or complaints and define the powers of the divisional code authority in handling such appeals and complaints.]

ARTICLE IV— SUBMITTING BIDS

Sect. 1—In order that whenever contracts are to be let by competitive bidding the terms of the competition shall be such as to insure fair competition, a general contractor, in submitting bids for the construction or improvement of either private or public works, shall be governed by the following regulations:

(*a*) All bids shall be in writing, signed by an authorized representative of the bidder. Alternate proposals may be submitted with the original bid, providing the same privilege is extended to all bidders.

(*b*) A general contractor shall not take advantage in his bid of any special privileges, favors or understanding had with him by persons in control of the award. This, however, shall not prevent any such competitor, even though not the lowest bidder, from taking such contract, providing the award is made at his original competitive price, nor shall it prevent any contractor from accepting the award of such contract at any price where no competitive bids are taken.

(*c*) A general contractor shall not revise his bid after bids have been opened in order to improve his position with the owner. Bona fide mistakes discovered after the opening of bids shall be grounds for withdrawal only.

Where supplemental bids are requested because of substantial changes in the plans and/or specifications, such bids shall reflect only the true value of the changes.

A general contractor shall not bid upon a private construction project upon which bids have been opened, or at any time within 90 days next thereafter, except there be substantial changes in the plans and specifications.

(*d*) Standards of accounting, cost keeping and estimating may be prescribed by subdivisions for the purpose of determining a fair price for services or products and systems for the interchange of such information subsequent to the award of specific work may be established.

ARTICLE V— TRADE PRACTICES

Sect. 1—A general contractor bidding upon or undertaking to execute construction contracts shall be properly qualified by capital, organization and experience. He shall own or have available sufficient and proper equipment to execute the work bid upon or furnish evidence of his ability to acquire same.

Sect. 2—A general contractor shall make available upon request to those responsible for the award of construction contracts, pertinent information as to his current financial position.

Sect. 3—A general contractor shall maintain and employ an adequate system of records and accounts, which system shall clearly show the allocation as to each specific project of all funds received or disbursed on account thereof.

Sect. 4—The following bases of contractual agreements are recognized, as fair trade practices; guaranteed price cost of the work plus a fee, unit price, lump sum, and other contractual methods not inimical to the public interest, providing that the regulations contained in this code of fair competition are met.

Sect. 5—A general contractor shall demand and insist upon receiving the contract payments as they become due in lawful money of the United States or its equivalent, as provided by the contract.

Sect. 6—A prequalified general contractor, who has met the necessary qualifications entitling him to the work, but who is unable, due to conditions beyond his control, to obtain the proper surety required by the contract, may agree with the owner and the Divisional Code Authority upon any other suretyship or security which does not violate any statute, charter, ordinance, or regulation requiring suretyship or security for the performance of, or in connection with such contract.

Sect. 7—A general contractor shall be ready and willing to settle disputed matters promptly.

Sect. 8—Funds received by a general contractor for construction work performed or to be performed by him shall be accepted and applied first for the purpose of paying amounts due from him to others in respect of any portion of such work including amounts due to employees, material men, sub-contractors and others. He shall make final payment of the balance due from him to such others within ten days after he has received final payments from the owner, provided satisfactory evidence is furnished showing that all outstanding claims against such others have been fully satisfied.

Sect. 9—A general contractor shall not give or accept rebates, refunds, allowances, unearned discounts or special services to or from sub-contractors, material vendors or others which are not extended under like terms and conditions to or by other sub-contractors, material vendors and others of equal credit rating.

Sect. 10—A general contractor shall not permit or require sub-contractors or material vendors to finance his accounts unless such arrangement is expressly provided for in the original contract between the parties.

Sect. 11—A general contractor shall inform sub-contractors with whom he is contracting of any waiver of lien rights executed by the general contractor.

Sect. 12—In competitive bidding a general contractor shall not assume the responsibility for deficiencies in or omissions from the plans and/or specifications, which he has not prepared or caused to be prepared by others, and upon which the contract is based.

Sect. 13—A general contractor shall provide for the welfare and safety of his workmen, complying with state laws governing such matters. In the absence of any such state laws, he shall comply with the provisions of the safety manual heretofore adopted by the Associated General Contractors of America.

Sect. 14—A general contractor shall not employ prison labor in the execution of the work.

Sect. 15—A general contractor shall as promptly as possible make payment of all wages due, in lawful currency of the United States, or by a negotiable check at par therefor payable on demand. The contractor or his agents shall accept no rebates directly or indirectly on such wages, nor give anything of value or extend favors to any person for the purpose of influencing rates of wages or the working conditions of his employees.

ARTICLE VI— MODIFICATION

Subject to the provisions of Section 2 (*c*) of Article IV, (*b*), of Chapter I of this code, the provisions of this chapter, except as to provisions required by the act, may be modified on the basis of experience or changes in circumstances, such modifications to be based upon application to the Administrator and such notice and hearing as he shall specify, and to become effective on his approval.

CURRENT NEWS

First Chapter of Construction Code Approved Jan. 31

FINAL approval of Chapter I of the construction industry code came suddenly, on Jan. 31, and as a dramatic incident in the annual meeting of the Associated General Contractors of America, in Washington. Under the 30-day effective clause, the code becomes operative on March 2.

Following the meeting of the Construction League general assembly on Feb. 2, the code committees met with representatives of the sponsors of the construction code, and laid plans for organizing the Construction Code Authority in Washington on Feb. 15. The approved code lists twenty sponsors, each of whom selects and appoints one member of the Code Authority, except the Associated General Contractors, which is given four members to represent building construction, highway construction, railroad construction, and public works and other types of general contracting. To this group of twenty-three members will be added appointees from other national trade associations which are not included in the list of sponsors, and which sponsor additional chapters of the code hereafter. Accordingly, after all chapters have been approved the Code Authority will consist of possibly thirty members.

Early work outlined

In a letter to General Johnson accompanying his approval of the construction code, the President voiced the opinion that the code afforded a great opportunity for solving many of the problems which have distressed the construction industry. He referred to trade jurisdictional disputes as demanding immediate attention, and suggested that one of the first duties of the National Construction Planning and Adjustment Board be that of making a thorough study of such disputes, their causes and origin and methods of prevention. He asked that the board submit its findings and recommendations for his consideration and for such action or order as may be appropriate.

General Johnson has referred to the construction code as "the most constructive self-governing instrumentality yet conceived," paralleling to a very great degree the bituminous coal code. The Planning and Adjustment Board is regarded by executives of NRA and representatives of both employers and employees as offering the best approach yet found to an amicable solution of labor and other disputes in a major industry.

Chapter I lays the foundation upon which all of the various branches of construction can easily be coordinated. The code, with its general provisions and supplementary divisional chapters, provides the machinery for unification and integration of the construction industry.

With Chapter I out of the way, attention is now being focused on the completion of the various divisional chapters which will be sent through separately for approval. Eight of these chapters had been approved previously by NRA and were attached to Chapter I when the code was previously sent to the President, on Dec. 22, last. These chapters are generally in shape for quick approval. Agreement had been reached on Chapter II, General Contractors' Division, on Feb. 5. This chapter provides for separate subdivisions covering building construction, highway construction, and railroad and other heavy construction, each administered separately. Other chapters in the course of final negotiation include Painting, Wallpapering and Decorating Division, Marble Contracting Division, Heating, Piping and Air Conditioning Division, Tile Contracting Division, Elevator Manufacturing Division, Roofing and Sheet Metal Contractors' Division, Mason Contractors' Division, Contracting and Retail Plumbing Division, Plastering Division, and Electrical Contracting Division.

Architects' and engineers' codes

Divisional Chapters for the professional or design groups—architects and professional engineers—have not progressed appreciably in the past week. The architects' code is still involved over the inclusion of a minimum fee system, while the professional engineers' code, which was rewritten to include certain allied engineering design and construction or selling groups, is still under discussion.

Chapter I of the Construction Code is reproduced on p. *209* of this issue, and Chapter II (not yet approved) is reproduced on p. *213*.

Copies of the approved chapters may be obtained from the Superintendent of Documents, Washington, D. C., Price 5c.

Illinois Asks for Proposals on Year's Cement Requirements

Taking advantage of the suspension of marketing sections of the cement code, reported in these pages last week, Illinois will open bids on Feb. 9 for 1,600,000 bbl. of cement for this year's bond issue roads. Until Article XI of the cement code was suspended, states were prohibited from buying cement direct from the mills except for specific projects. Illinois was prominent among the objectors to this provision of the code. Last year the state repeatedly rejected cement bids, all higher than the below-cost prices of the previous year, claiming collusion among cement manufacturers in submitting identical prices. Last June the state finally purchased 2,000,000 bbl. in the open market at a price $320,000 below that asked for in earlier bids for the year's requirements. Cement companies claim the practice of buying a year's supply at one time is ruinous to the market, and further charge that the states buying on this basis seldom take up the quantity specified, though the mills are forced to hold the entire amount in anticipation.

Construction League Makes Plans for Expanding Its Work

MEETING at Washington in its third annual assembly on Feb. 1, the day following President Roosevelt's approval of the construction code, the Construction League of the United States last week took preliminary steps toward expanding its organization and working field in harmony with the increased responsibilities imposed by the code. It recognized the need for setting up effective state organizations, but concluded that these organizations must in no way conflict with the operation and authority of the national trade associations which form its membership. Accordingly, the meeting empowered the policy committee to draft a plan of local organization, and in the meantime authorized the committee to arrange for the affiliation of such state groups as have a membership that is thoroughly representative of the construction industry. Such affiliation is to be based on the distinct understanding that in their service to their individual members the local groups shall not invade the field of the local branches or chapters of the trade associations, and that the primary authority of the national trade associations shall be maintained.

It is expected that this action will shortly result in the establishment of a complete plan of state or regional organizations of the League, parallel with the geographical subdivision of code authority organization under the several divisional chapters of the construction code.

Federal relief work

Other important action of the League meeting centered on the current public-works program and on the Civil Works Administration. After full discussion of the extensive activities of these organizations the League expressed concern over the influence of PWA and CWA wage rates and certain other practices upon the interests of construction. The meeting authorized the officers of the League to keep in close touch with conditions and developments in respect to further appropriations, and authorized them to take such action as changing conditions might require. Particular stress was laid on the importance of having CWA projects supervised by existing competent employer representatives or organizations, and the officers were instructed to include this matter in their consideration of CWA activities.

Construction code

An enlightening discussion of the construction code as finally approved was presented by S. F. Voorhees, chairman of the code committee. Mr. Voorhees said that the area-agreement provision, contained in the code drafts virtually from the first and retained in the adopted code, will probably present many questions that cannot be answered in advance but must be worked up from the actual facts. The Construction Code Authority also remains substantially as originally planned, but its functioning will be better coordinated if, as seems likely, the heads of the divisional code authorities are named as members of the Construction Code Authority. The Construction Appeals Board provides for overcoming any unbalance between divisions that may exist in the code authority itself. The Planning and Adjustment Board, whose members are nominated respectively by the Industrial Advisory Board and the Labor Advisory Board of the NRA, deals with labor questions only; it has the power to establish regional boards but is not required to do so. Other complaint boards established by the code operate independently of the planning and adjustment board.

A. C. Tozzer, retiring president of the A.G.C., explained that the clause establishing the Planning and Adjustment Board had been revised from its original form, without essential change of purpose or function, to provide for needed safeguards and clarification. As now organized by the code, the board has great possibilities to improve conditions in the construction industry, he believes.

Federal housing plans

Housing was discussed by Frederick H. McDonald, of Atlanta, and by Robert D. Kohn, Director of the housing division of the PWA. Mr. Kohn discussed in instructive manner some of the conditions and present problems of the housing administration, and said that the PWA will not set up competition with good housing, while as to bad housing they do not care how much they will compete; and, he added, "the country is full of bad housing." In his extended travels to examine current housing projects, he has learned that cities in general know little about their housing needs. The statistical data necessary in support of applications for projects are usually ridiculously inadequate. However, the great cost to cities of maintaining their slum areas is gradually being learned; such areas cost the public three to four times what the city collects (or tries to collect) in taxes, and in some cases ten times as much.

Housing is a means for the rehabilitation of families, Mr. Kohn emphasized. Under political management or even real estate management, new low-cost housing is sure to go to those classes that are ready to pay the highest rent; it is therefore necessary to create in each city a socially-minded group that will see that the housing goes to the classes most in need of it.

Housing is the foundation of the construction industry's future for the next 10 or 20 years, Mr. Kohn asserted. The work now beginning is not merely an emergency program but a program for a decade or two. This does not mean that the federal government must remain in action, for cities will wake up to the fact that they can afford to pay half the cost of housing construction and still save money. What the federal government does should be only a beginning.

Following the discussion of these papers, the chairman was directed to appoint a committee on housing to assist in furthering the work of the housing division.

The subject of PWA allocations was dealt with by two resolutions, one urging Congress to appropriate $400 millions for highways for the fiscal year 1935 to be applied in the same way as the current allocation; the other recommending the earmarking of a larger proportion of the fund for public buildings.

Officers elected

The League elected Stephen F. Voorhees as its representative on the Construction Code Authority, which is to hold its first meeting within a few days. It reelected Alonzo J. Hammond general chairman of the League, A. P. Greensfelder second vice-chairman, and J. C. Bebb treasurer. The Policy Committee members for the coming year are: Stephen F. Voorhees and Merritt Harrison for the architects; Harrison P. Eddy and T. H. Cutler for the engineers; W. G. Luce and A. E. Horst for the general contractors; Oscar A. Reum and John H. Zink for the subcontractors; Lion Gardiner and C. G. Conley for the fabricators; F. W. Morse and F. P. Byington for the producers.

E. O. Wattis, President, of Six Companies, Inc., Dies

Edmund O. Wattis, the third man to occupy the position of president of Six Companies, Inc. since that organization was formed to build Boulder Dam, died at his home in Ogden, Utah on Feb. 3, age 78 years. His death was due to a heart attack. He had been in ill health for some time.

William H. Wattis, brother of E. O. Wattis was the first president of Six Companies, Inc. He died on Sept. 13, 1931 and was succeeded by W. A. Bechtel. Mr. Bechtel died on Aug. 28 last year while traveling in Russia.

E. O. Wattis is the last of the three Wattis brothers, natives of Uintah, Utah, who went into railroad construction as young men and, in 1911, founded the Utah Construction Company, one of the largest railroad construction organizations in the country. The company also was engaged in the construction of reclamation projects in the West. When bids were called on Boulder Dam on the Colorado River in 1930 the Utah Construction Company joined with the firms of McDonald & Kahn, Morrison-Knudsen, J. F. Shea & Co., Pacific Bridge Co. and Henry J. Kaiser and W. A. Bechtel, in the formation of Six Companies, Inc.

Red River Suspension Bridge Collapses When Cable Breaks

A suspension bridge of two 500-ft. main spans and 250-ft. side spans over the Red River on the highway between Durant, Okla. and Bonham, Tex. collapsed on the night of Jan. 30 as a result of a severed main cable on the Texas side of the river. Corrosion had weakened the cable and individual wires may have been broken several days before the accident when a herd of 200 cattle passed over the bridge. According to G. G. Wickline, bridge engineer, Texas highway department, other probable contributing causes are extra stress in the cable caused by low temperature and a sudden release of the cable over the saddle caused by gusts of wind.

The bridge is owned jointly by the states of Oklahoma and Texas, having been purchased about a year ago from a private toll bridge company, for $45,000. It was built in 1926 and has a 16-ft. roadway. Pictures of the wrecked structure indicate it to have been of light construction, no stiffening truss being visible while the deck apparently was of timber.

Rio Grande Rectification Work Below El Paso Ordered to Start

The state department has ordered L. M. Lawson, American Commissioner, International Boundaries Commission, to begin work on the rectification of the Rio Grande below El Paso at once.

The project extends from El Paso to the Box Canyon below Fort Quitman, Texas, a distance of 155 miles by river, and calls for reduction of the river length to 88 miles, provision between levees along this 88-mile stretch of a floodway 590 ft. wide having a capacity of 11,000 sec.-ft. and an increase in the slope from 1.82 ft. per mi. to 3.20 ft. Construction of Caballo Reservoir also is included in the project. The total estimated cost of the project to the U. S. is $5,256,634 of which $2,800,000 has recently been made available by the PWA.

A description of the work was given in *Engineering News-Record*, February 16, 1933, p. 226. The convention between the United States and Mexico became effective Nov. 10, 1933.

General Contractors Make Plans for Work Under Construction Code

WITH about 200 leading members in active conference through three full days the Associated General Contractors of America, in convention at Washington, D. C., Jan. 29-31, took definite steps to change its organization for code regulation. The changes included both a divisional set up and a moderation of membership requirements to include all general contractors. An active disccussion was had of codes, particularly for the divisions of the new organization. Including a long program of papers and addresses by leading contractors and federal officials connected with the public works administration, the convention time was fully occupied with important questions. The reorganization action and papers and addresses will be summarized in our next issue.

Reports of the administrative staff and officers of the association showed an increase in membership from 1,499 to 1,731 despite the withdrawal due to depression of several hundred members. The convention voted a budget of $101,000 for 1934, an increase of about $16,000 to be used largely in a membership recruiting campaign. Incidentally the association came through the year with a balance in the treasury of $1,611. A count of the ballots disclosed the election as president of N. F. Helmers, Siems-Helmers, Inc., St. Paul, Minn., and as vice-president at large of A. W. Merchant, Providence, R. I.

Myron B. Reynolds, City Engineer of Chicago, Dies

Holding the position of city engineer, the highest grade in the engineering service of the city of Chicago, Myron B. Reynolds, 54 years of age, died Jan. 27 of cancer of the throat.

After two years at Rose Polytechnic Institute, Mr. Reynolds transferred to Armour Institute of Technology from which he was graduated in civil engineering in 1906. Two years later he received a C.E. degree from Armour. He immediately entered Chicago city employ and, except for two leaves of absence when he engaged in contracting for two years and in military service 15 months, he was continuously in the city service.

From 1911 to 1913 Mr. Reynolds was assistant engineer on design and construction on the Michigan Ave. improvement project after which he was promoted to the position of engineer of water works design. Here he was active on the design of the Lake View and Mayfair pumping stations; the Western Ave. tunnel and the Wilson Ave. tunnel system and crib. In the war he was detailed as instructor as captain at Camp Lee and as major, Camp Humphries, being honorably discharged from Camp Travis, Texas, and returned to the city engineering service. He was commander of Castle Post 151 of American Legion, a post of professional engineers. In 1923 under John Ericson he was promoted to assistant city engineer and after the death of Mr. Ericson in April, 1927, served as acting city engineer until October that year. In 1931 he became city engineer.

Mr. Reynolds offered many of the recommendations during the last 20 years which brought about the modernizing of the water works system into its present efficient units. He was a strong advocate of metering and filtration and did much to advance these projects.

As a member of the American Society of Mechanical Engineers and the American Water Works Association he contributed freely of his work and experience to engineering literature. Just a few days before his death he was awarded the annual medal of the Illinois Society of Engineers for the best paper of the previous year. He was the senior author of a paper with Arthur E. Gorman on "Chicago's Water Pollution Problem, Past, Present and Future."

Loan Made by PWA to Southern Pacific For Track Work

A SUM of $4,473,905 for track construction and $803,920 for repairs to trestles and culverts is included in a loan of $12,000,000 to the Southern Pacific Company approved recently by the Public Works Administration. Included in the track work is 40,000 tons of new rail with fastenings and 1,820,000 cross ties. The remainder of the loan is for repairs to cars and locomotives.

Allotments totaling $1,850,200 for 43 non-federal projects were approved last week, four earlier allotments were decreased by $178,800, and 30 allotments totaling $1,897,160 were rescinded. The largest of these was $950,000 to Denver, Col., for waterworks improvements. In one instance the job for which the loan had been approved is now about 90 per cent complete, having been built before the bond contract was signed and without PWA supervision.

Maryland highway work

A contract for a loan of $5,411,866 between the PWA and the state of Maryland was signed on Feb. 4. It is for highway work in addition to the allotment made to the state from the $400,000,000 highway fund. Repayment is to be made from license fees and franchise taxes on commercial vehicles or from a toll on the Conowingo and Havre de Grace bridges, hence a large part of the money is to be spent on roads serving these bridges.

Contract for a loan of $1,039,000 to the Juniata Park Housing Corp., for a housing project in the Kensington district of Philadelphia, has been signed and work on the project is expected to begin at once. Contract has been let to the Turner Construction Co. The original allotment was made to the American Federation of Full Fashioned Hosiery Workers and was for $845,000.

A new floor is to be added to the Interior Dept. building in Washington under an allotment of $800,000. An earlier allotment of $200,000 has been rescinded. The offices will be air-conditioned.

A division of economics and statistics has been organized by the Public Works Administration.

Municipal Housing Law Enacted in New York State

The enactment on Jan. 31 of a municipal housing and slum clearance law by the New York state legislature places New York City in a position to utilize the $25,000,000 allotted to it by the Public Works Emergency Housing Corp. The new law, passed as an amendment to the existing state housing law, provides "for the establishment, organization, operation and dissolution of municipal housing authorities." It applies to all cities in the state but was drafted and passed under the guidance of New York City's slum clearance committee which was organized several months ago at the instance of Robert D. Kohn, director of the PWA housing division.

Under the provisions of the new law, mayors of cities are authorized to appoint housing authorities consisting of five members, serving without pay. One member of an authority, and not more than one, may be an official of the city. This provision, it is understood, was included to permit the present tenement house commissioner of New York City, Langdon W. Post, who has been active in slum clearance and low cost housing planning, to be a member of the New York City authority.

An authority may exercise the power of eminent domain; and it may issue notes, debentures or other evidences of indebtedness, with mortgages upon its property as security. These securities are legal investments. On the other hand the housing authorities have no power to pledge the credit of the state or a city, and no responsibility for the securities of the housing authority is assumed by the state or a city. Tax exemption is provided for all property of a housing authority but in lieu of taxes it is stipulated that fixed sums shall be paid to the city annually.

Power Plants To Be Built at Two Dams on Kanawha River

The Kanawha Valley Power Co. has been authorized to construct power plants estimated to cost $5,000,000 at the new government dams at London and Marmet on the Kanawha River in West Virginia. The power company agreed to furnish light and power needed in the operation of the locks and dams and to pay the government $32,000 annually for the use of the water.

DETAILS OF PWA LOANS AND GRANTS FOR NON-FEDERAL WORK

LOCALITY	LOAN AND GRANT OR GRANT	TYPE	AMOUNT
Cincinnati, O. (Decrease)	G	Waterworks	$54,600
Tappahannock, Va. (Increase)	G	School	3,300
Jefferson County, Kan. (Decrease)	L. & G	Bridge	6,400
Ridge Farm, Ill.	L. & G	Waterworks	53,000
Eminence, Ky.	L. & G	Waterworks	90,000
Vienna, Ill.	L. & G	Waterworks	60,000
Algonia, Wis.	L. & G	School	148,000
Olive Hill, Ky.	L. & G	Filter Plant	26,000
Henceville, Ala.	L. & G	Waterworks	20,000
Wellington, Colo.	L. & G	Waterworks	5,000
Worcester, Mass. (Decrease)	G	Waterworks	101,800
Rembrandt, Iowa	L. & G	Waterworks	13,000
Mt. Sterling, Ill.	L. & G	Water Improvement	80,000
Junction City, Ky.	L. & G	Waterworks	52,000
Shreveport, La.	L. & G	Incinerator	200,000
Granite, Okla. (Decrease)	L. & G	Sewer System	16,000
Shreveport, La.	L. & G	Police Radio	5,000
Shreveport, La.	L. & G	Building	40,000
Centerville, Md. (Increase)	L. & G	Sewage Plant	1,300
Shreveport, La.	L. & G	Streets	150,000
Shreveport, La.	L. & G	Courthouse	18,000
Shreveport, La.	L. & G	Engine house	$10,000
Shreveport, La.	L. & G	Fire Alarms	60,000
Shreveport, La.	L. & G	City Hall	40,000
Shreveport, La.	L. & G	Fire Station	20,000
Belpre, Ohio	L. & G	Waterworks	72,000
Springville, Ala.	L. & G	Waterworks	36,000
Athens County, Ohio	L. & G	Building	30,000
Martin, Ky.	L. & G	Waterworks	43,000
Florence, Ala. (Increase)	L. & G	Electric Distribution System	24,000
Moorhead, Minn.	L. & G	Sewer System	170,000
Waveland, Miss.	L. & G	Streets	49,000
Weimar, Texas	L. & G	Waterworks	10,000
Rogers County, Okla.	L. & G	School	15,000
North Haven, Maine	L. & G	Waterworks	6,000
Columbia, Mo.	L. & G	Jail	41,000
Spickardsville, Mo.	L. & G	Waterworks	11,000
Yocona Drainage Dist., Miss.	G	Drainage Work	3,000
Clark County, Ill.	L. & G	School	8,000
Clarksville, Tenn.	G	School	14,000
Holyoke, Mass.	G	Gas Holder	61,000
Burlington, Vt.	G	Electric System	74,000
State of Connecticut	G	Bridges	88,000
		Total	$1,850,200
		Total decreases	$178,800

Contract Let for Last Bridge Over Waterway in Illinois

The state of Illinois has awarded the contract for the substructure of the Ruby St. bridge across the Illinois waterway at Joliet to the Thompson Construction Co. of Joliet on a bid of $122,919, and contract for the superstructure to the Milwaukee Bridge Co., Milwaukee, Wis. on its bid of $329,340. The bridge is of the bascule type giving a clear opening of 120 ft. and having a vertical clearance of 16½ ft. when closed. Construction of the bridge is in charge of the Division of Waterways of which Walter M. Smith is acting chief engineer.

Lockport Seeks to Develop Power with Water from Barge Canal

The city of Lockport, N. Y., has engaged engineers to prepare plans and to gather the necessary data with which to make application to the Federal Power Commission for a permit to develop power with the 275 sec.-ft. of water from the barge canal that is available for power development at Lockport. The water is now being used by the Niagara Falls Power Company under a temporary permit. It is diverted from the Niagara River above the falls and is included in the water assigned to the United States in the treaty between the United States and Canada controlling the diversion of water from the river above Niagara Falls.

Beaver-Mahoning Waterways Approved by Army Engineers

Development of the Beaver and Mahoning Rivers as a modern waterways to give the Youngstown industrial area an outlet to the Ohio River waterway system is reported as being approved by the Board of Engineers for Rivers and Harbors. The board's report is expected to be transmitted to Congress in the near future. In 1931 Congress ordered the Corps of Engineers to make a report on a long-proposed waterway from the Ohio River through the Youngstown district to Lake Erie. Last year the Army Engineers reported unfavorably on the project, chiefly on the grounds that insufficient water was available. The portion of the project now approved is estimated to cost about $35,000,000.

PWA Funds Sought to Complete Financing of Golden Gate Bridge

The Golden Gate Bridge and Highway District has applied to the Public Works Administration to purchase $26,000,000 of the bridge bonds remaining unsold in order that it may complete construction of the Golden Gate Bridge at San Francisco.

A bond issue of $35,000,000 for the construction of the bridge was voted by the district in 1932 and a syndicate headed by the Bank of America took $9,000,000 of the bonds late in the year in order to get the work under way.

Illinois Society of Engineers Adopt Proposed Engineer License Law

IN addition to holding a full session on public affairs the Illinois Society of Engineers at the Springfield meeting Jan. 31 to Feb. 3 broke a precedent of many years' standing in adopting with little debate an engineers' license law. This law is the one which recently lost out for lack of time after getting through the senate and up to the third reading in the house. Always heretofore the society has not started on legislation until the legislature was in session. This time it has a full year in which to lay their plans.

A resolution called on the Weather Bureau to continue as in the past to report excessive precipitations, a recent order having required a recording only of rains in excess of 1 in. per hour.

The U. S. Geological Survey has discontinued 10 of the 39 gaging stations in the state owing to lack of funds, and probably will cut off 7 more in July. A serious detriment to the existing record will ensue and the society is protesting to the Survey and other officials.

The engineers want the sewage testing station at Urbana opened. It is closed for lack of funds. The governor and legislature will be aproached on the subject.

The matter of an advertisement for a city engineer for Peru, Ill. (see *ENR*, Jan. 18, p. 92) was brought up and placed on file. In cloak room discussion attention was called to similar advertisements being handled by American Society of Civil Engineers. No obloquy seems to attach to engineers who enter their proposals if the latter are in accord with ethical practice, the advertisement being taken simply as one means a town has of requesting engineers to come in and not being any different than a series of individual letters or phone calls. Education of city officials as to the proper way to hire expert services needs attention in the opinion of several prominent engineers but none cared to bring the matter to the floor of the regular meeting.

While the legislative committee reported a failure of the license law it claimed success in pulling through the sewer rental law (afterward declared invalid) and the amendment allocating one cent gas tax to the cities. A surveyor's license law failed because it was not introduced by the right legislator. An effort will be made to enlist the support of all engineering organizations for this and the engineers law next year. Not all were favorable, or at least were not militantly active last year.

Daniel W. Mead and E. E. R. Tratman were elected to honorary membership.

The annual award went to M. B. Reynolds and Arthur E. Gorman for a paper on "Chicago's Water Pollution Problem." It was presented to Major Reynolds a few days before his death.

Newly elected officers are as follows: President, C. M. Slaymaker; vice-president, G. W. Pickels; and secretary-treasurer, Prof. H. E. Babbitt, Urbana, Ill.

The next meeting, the fiftieth anniversary meeting, will be held in East St. Louis.

SOCIETY CALENDAR

AMERICAN CONCRETE INSTITUTE, Toronto, Ontario, Canada, Feb. 20-22, 1934.

AMERICAN RAILWAY ENGINEERING ASSOCIATION, Chicago, Ill., March 13-14, 1934.

AMERICAN SOCIETY FOR TESTING MATERIALS, Atlantic City, N. J., June 25-29, 1934.

AMERICAN WATER WORKS ASSOCIATION, annual convention, New York, June 4-8, 1934.

SMOKE PREVENTION ASSOCIATION, annual convention, June 19-22, Buffalo, N. Y.

ASSOCIATION OF HIGHWAY OFFICIALS OF NORTH ATLANTIC STATES will hold its tenth annual convention at Atlantic City on February 14.

FOUR STATES SECTION, American Water Works Association, will hold its annual meeting at Philadelphia March 7 and 8.

KENTUCKY-TENNESSEE SECTION, American Water Works Association, will hold its annual meeting at Knoxville, Tenn., March 1 to 3.

FIFTH ANNUAL GREATER NEW YORK SAFETY CONFERENCE will be held in New York City on March 6 and 7. The conference is sponsored by the Metropolitan Chapter, American Society of Safety Engineers.

FOURTH INTERNATIONAL CONGRESS FOR APPLIED MECHANICS will be held at Cambridge, England, July 3 to 9. The subjects to be considered are divided under four heads: (1) Rational mechanics, including vibration of structures and machines; (2) mechanics of fluids, including turbulence; (3) materials, including elasticity, plasticity, fatigue and crystal structures; (4) waterways, including resistance and stability of ships and seaplanes. Information concerning the Congress may be obtained from the Applied Mechanics Division, American Society of Mechanical Engineers, 29 West 39th St., New York, N. Y.

ROCHESTER SECTION, American Society of Civil Engineers, at its annual meeting on January 4, elected Carl C. Cooman, president.

LOUISIANA ENGINEERING SOCIETY, at its recent annual banquet, elected Archibald L. Dunlap, assistant professor of engineering at Tulane University, president.

ILLINOIS CONTRACTORS ASSOCIATION, at its twenty-seventh annual convention at Springfield, Ill., on January 17-18, elected J. M. Driscoll, of Decatur, president, to succeed H. H. Hall, of East St. Louis. Some 200 members attended the convention.

KENTUCKY SOCIETY OF PROFESSIONAL ENGINEERS, organized at Frankfort, Ky., on January 17, has elected J. F. Watkins, of Lexington, as president. The immediate objective of the organization is to obtain passage of a law for registration of engineers. C. S. Crouse, of Lexington, was named secretary-treasurer.

NEW BRUNSWICK ASSOCIATION OF PROFESSIONAL ENGINEERS, at its annual meeting at St. Johns, N. B., elected J. D. Gary, chief engineer of the New Brunswick Power Co., president, to succeed G. C. Torrens. A feature of the meeting was a joint dinner with the St. Johns branch of the Engineering Institute of Canada.

THE AMERICAN TOLL BRIDGE ASSOCIATION held its annual convention in Cincinnati, Ohio, Jan. 26-27. A considerable number of papers and reports were presented concerning various matters pertaining to toll bridge operations. J. R. Burkey, bridge engineer, Ohio state highway department, and E. Ross division engineer, Kentucky state highway commission, were on the program. The proposed code for the toll bridge industry was discussed in detail; the NRA has set February 28 as the date of a public hearing on the code. A. Clifford Shinkle, president of the Covington & Cincinnati Bridge Co., was elected president of the association to succeed D. B. Steinman. P. K. Schuyler, president, Federal Bridge Co., Washington, D. C., was re-elected secretary.

Obituary

B. W. Cocke, a general contractor of Memphis, Tenn., died in that city on Jan. 31 at the age of 64. Mr. Cocke was the builder of the U. S. Engineers Building across the river from Memphis, recently completed.

Claude Ludington, general contractor of Rochester, N. Y., died suddenly in Orlando, Fla., at the age of 57. Mr. Ludington organized his construction company in 1910, and two of its largest jobs were the construction of the Rochester section of the New York State Barge Canal and the Rochester subway in the bed of the old Erie Canal.

John Wesley Goodridge, who until his retirement two years ago was vice-president of the Litchfield Construction Co., New York, N. Y., died on Feb. 4 at the age of 57. Mr. Goodridge was for nine years connected with the construction of subways in New York City, being engaged on the construction of the Lexington Avenue subway and later aiding in the construction of the Seventh Avenue line.

Garrett T. Seely, vice-president and general manager of the Chicago Motor Coach Co., and formerly engineer of maintenance of the South Side Elevated Railroad, died on Jan. 25 in Miami, Fla. In 1899 he graduated from the University of Illinois and gained his early engineering experience with the Santa Fe and Chicago & Western Indiana railroads.

Walter Gaynor Caldwell, consulting civil engineer, Waukesha, Wis., chairman of PWA advisory board, died Jan. 28. Born in Pewaukee, Wis., in 1886 he was graduated from the University of Wisconsin and was with the Wisconsin Highway Commission for the next two years. Then he was in contracting for five years and in the war during 1917 and '18. From 1918 to 1921 he was highway engineer for Waukesha County when he started a consulting office. Mr. Caldwell made a specialty of land titles. He was engineer for the County Park Board and County Drainage Board. Elected to the Wisconsin State Legislature last year he was one of the most active members fostering the PWA program. Mr. Caldwell was chairman of the Highway Commission when appointed to the PWA board.

Ira A. Williams, a well-known engineering geologist of Portland, Ore., died at his home in that city Jan. 23. He had specialized on dam foundations and had extensive experience throughout the Northwest on this type of work. He was consultant on the Owyhee Dam and recently had been appointed consulting geologist of the Bonneville Dam. Mr. Williams was born in Iowa 58 years ago and graduated from Iowa College in 1898. Thereafter he did post-graduate work or taught at Ohio State, Columbia University, University of Washington and Oregon School of Mines. For some years he was assistant geologist on the Iowa Geological Survey, later with the U. S. Geological Survey and then on the Oregon Bureau of Mines and Geology. He was consultant ceramist to the U. S. Bureau of Mines and was active in geological and technical societies.

CONSTRUCTION STATISTICS OF THE WEEK

Public contract awards bring this week's total of engineering construction well above last year's average February week, above the previous four weeks' average and slightly above the average week to date for 1934. The total for the week is $23,937,000 of which $22,814,000 is for public awards and $1,123,000 for private.

Federal awards returned to $7.1 millions from the $2.2 millions low of last week, state and municipal rose to $15.7 millions while private contracts dropped from $5.4 millions last week to $1.1 millions this week. In the public awards waterworks at $5.5 millions includes a $4.7 contract in Southern California, bridges total $4.2 millions up from $1.4 millions, earthwork, irrigation, drainage and waterways returned to $3.9 millions from $0.3 millions last week, and highways rose slightly from $6 millions to $6.5 millions. The drop in private work was largely due to a drop in commercial buildings.

Large awards include highway lettings, $884,000 in Pennsylvania and $822,000 in Montana and a $1,507,000 road program by state forces in Missouri; $4,712,720 for contracts and force account work on East Eagle Mountain Tunnel and Coachella Tunnel, Metropolitan Water District, Los Angeles; grade separation and railroad bridges over Missouri River to give access to Fort Peck Dam, Montana, $985,000; Lock 12, Missouri River, $1,437,000; electrical equipment for U. S. Engineers, dredges, and substructure work for power house and lock, Bonneville Dam, Oregon, $1,173,390.

PWA allotments dropped to $2,170,000, of which $500,000 was for a loan to earthquake damaged property owners in Long Beach. Municipal bonds increased in numbers sold but all issues were small and totalled only $2,592,000. Corporate issues reported this week include the $7 millions Mathieson Alkali Works, Inc., new stock issue and funds from surplus for construction of their new plant in Louisiana. Municipal bond prices continue high, with a scarcity of "prime" issues reported.

CONTRACTS
(Thousands of Dollars)

	Weekly Average Feb. 1933	Weekly Average Prev. 4 Weeks	Week Feb. 8 1934
Federal Government	$3,737	$6,027	$7,135
State and municipal	5,873	12,391	15,679
Total public.....	$9,611	$18,418	$22,814
Total private....	5,517	4,244	1,123
Week's total	$15,128	$22,662	$23,937

Cumulative to date:
1933 .....$130,430 1934 .....$142,173

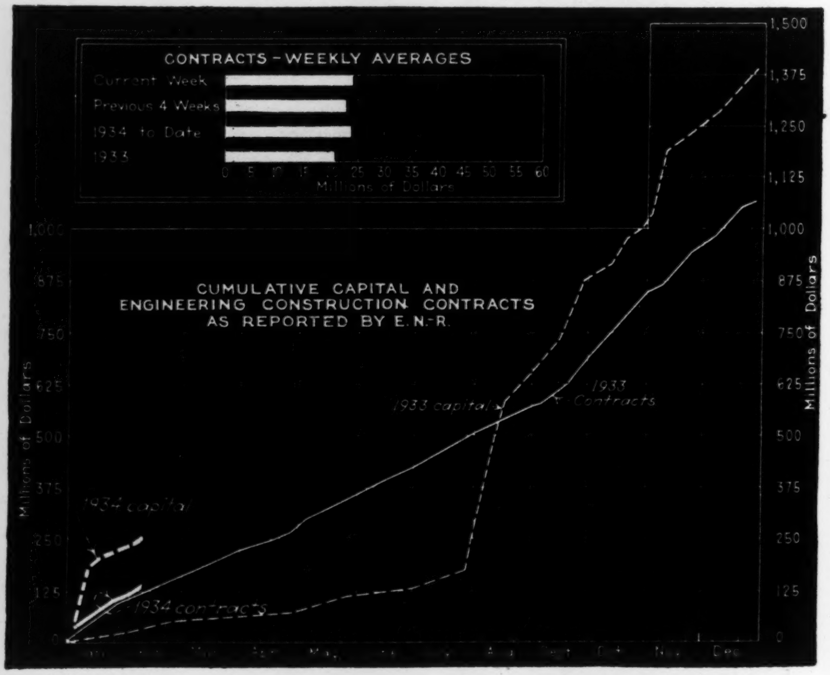
NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

1934	Week Feb. 8	Cumulative
State and municipal....	$2,592	$29,033
PWA allotments, S&M.	1,670	174,905
Corporate issues	7,115	10,166
PWA allotments, private	500	36,524
Total, Non-Federal..	$11,877	$250,628
PWA allotments Federal Constr.	800	45,734
Total new capital....	$12,677	$296,362

Cumulative total to date:
1933 ......$42,600 1934 ....$250,628
Rescinded or reduced allotments (from 1933 PWA totals)....... $34,399

INDEX NUMBER

E.N.-R.-Cost		E.N.-R.-Volume	
February, 1934 ..	**194.04**	**January, 1934** ..	**113**
January, 1934....	191.26	December, 1933.	116
January, 1933....	159.30	January, 1933...	129
1933 (Average)...	170.28	1933 (Average) ..	102
1932 (Average)...	156.97	1932 (Average) ..	127
1931 (Average)...	181.35	1931 (Average) ..	220

1913 (Average).............100